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TADZHIK SSR

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Tadzhikskaya SSR
/Tadzhik SSR/
1956, Moscow
Pages 1-228

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Introduction

The Tadzhik Soviet Socialist Republic is situated in the southeast of Soviet Central Asia. It covers an area of 142,600 sq km and has a population of 1.8 million, predominantly Tadzhik.

Tadzhikistan is one of the highest-altitude republics of the Soviet Union. Included within its borders is the vast Pamir highland averaging about 4,000 m above sea level. Extending from East to West across the entire territory of the republic are powerful mountain ranges, the Tien Shan and Pamiro-Alai mountain spurs. Parts of the deserts and semi-deserts of the great Turanian Plain are wedged into the republic's territory on the West where they gradually rise to the foothills. It is in that area, along the broad and well irrigated mountain valleys that the major part of the republic's population is concentrated.

Prior to the Great October Socialist Revolution, the territory of modern Tadzhikistan had been divided into a northern and southern part by a state border running along the Gissar mountain range. Northern Tadzhikistan was part of the Turkestan governors-generalship and belonged to Russia. It had several coal and oil extracting industrial enterprises, and cotton, fruit, and vine growing was developing on a rather small scale. The southern part was subordinated to the vassal of the Russian empire, the Bokharan khanate, and was in effect its colony. There was practically no cotton grown there, and agriculture was restricted mostly to grain growing. About 80% of the arable land belonged to the emir himself, his officials and large landowners while the dekhkans worked those lands under conditions of semiserfdom. There were no modern roads and no large industry. There were no secular schools. The entire population was practically illiterate (one literate person for every 200 people).

Since the establishment of the Soviet government, Tadzhikistan has traveled far along the road of large-scale economic and cultural construction.

A modern road network was built in the republic. A railroad was built extending into the Gissar valley in the southern part of the country. Hundreds of kilometers of automobile highways were laid across previously inaccessible highland districts.

A socialist mechanized agricultural system has been established. Tadzhikistan, a cotton-growing country, has long held first place in the Soviet Union in cotton crop capacity and second place in overall cotton production. The southern part of Tadzhikistan, situated in the dry subtropical belt, produces such highly valuable subtropical and tropical cultures as long-fiber cotton, geranium, lemons, and many others. The Vakhsh Valley, practically rehabilitated from scratch under the Soviet Government, is the largest center of long-fiber types of cotton in the country. There is extensive vine and fruit growing, particularly apricots, on irrigated fields. Walnuts, almonds, and peanuts are grown at various levels on mountain slopes. Large areas of the mountain slopes requiring no irrigation are planted to grain, bean and oleogenous cultures, wheat, barley, "curly" flax [*len-kudryash*], sesame, and others.

Everywhere in Tadzhikistan the collective and state farms take good advantage of the highland summer pastures and valley winter pastures for their pasture cattle. Here they raise one of the largest breeds of mutton-tallow sheep in the world, the Gissar sheep. Karakul sheep breeding is well developed in the semidesert districts. Silkworm breeding is an important part of agriculture.

The country's subsoil is rich in a variety of minerals. Available on a commercial scale are coal, oil, polymetals, wolfram, arsenic, antimony, bismuth, tin, celestine, fluorspar, ozocerite (mineral wax), table salt, and a variety of building materials. Up to 60 different minerals, found in over 300 deposits are successfully mined and used on a large scale.

The power potential of the country's mountain rivers, which account for more than half of such water resources in Central Asia, is very great.

The agricultural and mining raw materials represent a reliable raw-material base for Tadzhikistan's leading industries. The following industries were built: cotton-processing, oil-producing, fruit canning, wine making, flour milling, meat, silk, textile tanning, etc. The republic's heavy industry is rising to a conspicuous level. This is manifested primarily in the production of coal, oil, polymetals, and rare metals as well as in the production of building materials. Large mechanical-engineering plants are under construction.

The party and the government have outlined vast possibilities for the further expansion of the national economy of the Tadzhik SSR in the Sixth Five-Year Plan.

Growing with the expanding economy is the culture and material well-being of the population. One-third of the republic's state budget is spent annually for national education. The schools are attended by all children of school age. More than 30 colleges and special middle schools were opened. Six colleges were opened in Stalinabad. The republic has an Academy of Sciences. The Sixth Five-Year Plan has appropriated for the construction of schools, hospitals, theatres, houses of culture, libraries, and stadiums in the Sixth Five-Year Plan. A television station and planetarium will be built.

1. NATURAL CONDITIONS AND RESOURCES

The Tadzhik SSR is situated in the southeastern part of Soviet Central Asia between latitudes 36°40' and 41°05' N.

The republic is on the same latitude as southern Spain, Turkey, and the northern half of the island of Honshu (Japan).

Tadzhikistan borders on 2 foreign countries, the Chinese People's Republic in the east and Afghanistan in the South. The narrow strip of the "Afghan Corridor," which is 15 to 65 km wide, separates the Soviet Pamir from India and Pakistan.

The territory of the republic, extending 680 km from West to East, narrows down toward the middle part to 100 km and has an elongated ledge in the northwest. Tadzhikistan's borderlines are very sinuous. They were established over a period of years. The eastern border with China was fixed along the Sarykol'skiy mountain range in 1894. The southern border, running along the Pamir, Pyandzh, and Amu-Darya rivers, was established in 1895. The western and northern borders, separating Tadzhikistan from Uzbekistan and Kirgizia, were fixed in 1925 so that the areas inhabited primarily by Tadzhiks were included in the then autonomous Tadzhik republic. The extreme northwestern ledge (the former Khodzhentskiy okrug and now part of Leninabad Oblast), with a predominant Tadzhik population, was added to the Tadzhik SSR which was formed in 1929.

Tadzhikistan is situated at the junction of the central Asiatic deserts and the vast central Asiatic uplands. The gradual topographic change from the former to the latter determines its highly variegated natural conditions.

Relief

Tadzhikistan is mainly a mountain country. Sixty-two % of its territory (according to the explication of the land in 1952) consists of mountain ranges, cliffs, rocky places, glaciers, etc, which cannot be utilized for economic purposes. The irrigated valleys, in which almost the entire population of the republic is concentrated, account for only 7% of the entire territory.

Mountain ranges are the prevailing forms of relief. They belong to 2 grandiose mountain systems, Tien Shan in the north and Pamir in the south, and practically cover the entire territory of the republic. Most of them extend from West to East. Their height is reduced at the approaches to the western borders where they spread out fanwise and merge with the surrounding plains beyond the borders of the republic.

Between the separating ranges of western Tadzhikistan are broad habitable and economically useful valleys, some of which are 300 m above sea level. In easterly direction the mountains become higher and closer, some of them forming majestic mountain-peak concentrations [gornyye uzly"]. Some of the mountain ranges reach an average height of 5,000-6,000 m while certain peaks rise 1,500-2,000 m above that. The highest point in the Soviet Union is the Stalin Peak of the Academy of Sciences Mountain Range; it is 7,495 m above sea level.

The enormous range of heights and the highly diversified relief of the country account for the unusually variegated landscape. Most conspicuous are the differences between the following 3 groups of areas: intermountain depressions, uneven elevations, and the flat upland of East Pamir.

Among the vast low-depression areas in the republic are; the western part of the Fergana Valley between the Kuraminskiy and Turkestanskiy ranges in the North, and the so-called South-Tadzhik Depression, forming a triangle between the Gissarskiy and Darvazskiy ranges in the Southwest. The latter is made up of a number of valleys — Gissar, Vakhsh, Kafirniganskaya, Kyzylsuyskaya, etc — which are separated by low mountain chains and hills.

The landscapes of the Fergana valley and the valleys of the South Tadzhik Depression have much in common. Their altitude is relatively low (300-800 m), their surface is flat, and their areas large. They are irrigated by large rivers. From an economical point of view they are the most important valleys in the republic. They are densely populated and well cultivated. The dominant features there are "culture landscapes" or oases.

The bottoms of the valleys usually slant steeply upwards, turning into foothill plains. The latter differ in width, height, slope, and diversity of relief, their only common feature being that they are zones extending into mountain areas.

Some of the foothill plains are very large; the plain on the northern slope of the Turkestan Range, for example, extends 50-60 km from the edge of the valley to the foot of the range, then rises vertically from 400 to 1,900 m. These plains are usually intersected by small rivers, which form small valleys, and temporary streams that form ravines. Low mountain chains rise in some places, and their slopes are covered with forests (of which there are few in Tadzhikistan). The inhabited points are scattered in the form of oases along the small river valleys. Most of the dry watersheds are covered with pastureland; where there is more moisture the land is used for ploughing.

The foothill plains gradually rise to become mountainous areas which cover the northern, central, and southeastern parts of Tadzhikistan. Rising to various heights, they are characterized by a very broken relief.

To the north of the Fergana Valley there is a small mountain area consisting of 2 low mountain ranges, the Kuraminskiy Range and the Mogoltau Range; the average altitude of the former is no more than 2,000 m, and the latter no more than 1,000 m above sea level. These are the most ancient and the most eroded mountain ranges in Tadzhikistan, and they are very rich in mineral resources.

Located between the Fergana Valley and the South-Tadzhik Depression is the central Tadzhik mountain area. Converging in the Match mountain concentration are the Turkestan and Zeravshan ranges extending from the West and the Alay Range from the East (most of the latter belongs to Kirgizia). Extending from the Zeravshan Range in a southerly direction are the Gissar and Krateginskiy ranges. Their height declines from 5,000 m and over, in the Match mountain-concentration area, to 3,000 m and below at the western borders of the republic. The largest glacier in the area, the Zeravshan Glacier, measuring 25 km in length, is located in the Match area between the Turkestan and Zeravshan ranges.

Rising to the South of Central Tadzhikistan and North of the South-Tadzhik Depression is the Pamiro-Darvazskaya upland area, which is covered with the following huge interconnected Petr Pervyy, Darvazskiy, Vanchskiy, and Yazgulemskiy ranges. Abutting against the mountain group of the Academy of Sciences Range at the eastern end, these mountains form one of the most grandiose mountain massifs in Central Asia. The average

height of the Academy of Sciences range is 6,000 m, with some of its peaks rising to 7,000 m and more. (Stalin Peak is 7,495 m high, Yevgeniy Korzhenevskiy Peak 7,105 m, Molotov Peak 6,852 m, and Garmo Peak 6,595 m). The glaciation process on this mountain massif is among the most intensive in the world. The Fedchenko Glacier, one of the largest valley-type glaciers in the world is located there (it is 71 km long and covers an area of 907 sq km). Further North, separated from it by the deep Muksu River Valley, is the Zaalayskiy Range with Lenin Peak (7,134 m); separated by the Bartang River Valley in the South are the parallel ranges of Western Pamir: Rushanskiy, Shugnanskiy, Shakhdarinskiy, and Vakhanskiy.

The landscapes of the mountain areas, though changing in different localities, are on the whole quite different from those of the low valleys and foothills. The high ranges alternate with narrow and deep intermountain valleys which, as a rule, become open and wider toward the west. Turbulent rivers, huge taluses, and precipitous cliffs, which make these valleys uninhabitable for many kilometers, and terraces with their narrow alluvial fans irrigated by slope streams combine to form the general picture of the major and secondary valleys of the mountain areas.

The small inhabited points of the mountain valleys are located mostly on the terraces and alluvial fans where small-scale irrigated planting and fruit gardening are possible. The lower slopes of the valleys, well moistened by precipitation, are used for irrigationless planting, and the upper parts are, as a rule, used as summer pastures.

In point of surface structure, the east Pamir upland represents a special type of mountain area. Hilly conditions prevail up there, despite the high altitude, which is at least 3,600 m above sea level. Inordinately broad valleys, intersected by slow-flowing streams, flat basins with saucer-shaped lakes and relatively low ranges with rounded peaks and flat slopes covered with crushed rock are the most conspicuous forms of that cold, high-altitude desert. The territory of eastern Pamir is sparsely populated and is used mostly for grazing purposes.

The appearance of the modern relief of Tadzhikistan, the composition and distribution of its minerals, and its seismic conditions are determined by the geological past of the country. The major features of its various sections had been formed at different geological periods, from the Caledonian (Lower Paleozoic) to the Alpine period of mountain-formation. The earlier the mountain ranges were formed, the more complicated was their life: they were destroyed, covered by the sea, and rose again in the next mountain-forming period.

The contemporary mountain relief of Tadzhikistan was created by the Alpine mountain-forming movements, but that formation process was different in different places. The earliest manifestations of plication processes occurred in the northern part of the republic, in the Kuraminskiy and Mogoltau mountain ranges. In the Upper Paleozoic era, these movements covered central Tadzhikistan. The tectonic movements varied according to the physical condition of the various parts of the earth's crust. The sections composed of hard rock were broken up into fault-blocks which were shifting at various speeds in a vertical direction; the areas consisting of softer minerals were crumpled into folds. Finally, entire areas with a flattened topography slowly and gradually rose to a higher surface. That probably accounts for the plateau-like shape of the central part of the East Pamir Upland.

With few exceptions, the country's mountain areas are made up of paleozoic minerals of various ages, measuring many thousands of meters in thickness. For a long period of time, these minerals continued to rise and disintegrate and their debris were carried by the rivers to lower altitudes where they formed huge strata. In the late Alpine Period, the mineral deposits accumulated in the depressions were crumpled into folds and raised to an enormous height (Peter Pervyy Range, the northern slope of the Zaalayskiy Range, and the southwestern part of Darvazskiy Range), or they formed the comparatively low mountain chains with which the South-Tadzhik Depression and the Fergana Valley are studded.

Recurrent volcanic activities, resulting in the formation of crystalline rock massifs and effusive rock covers, took place during the Paleozoic Period in what is now Tadzhikistan. Connected with the volcanic rock is the formation of most of the mineral deposits which are found in the Paleozoic rocks. Ore deposits are very seldom found in the residues of the mesozoic and tertiary periods which contain mostly nonmetallic and fuel minerals.

Seismically unstable zones, noted for their frequent earthquakes, are found between the ancient and more recent mountain systems, particularly within South Tadzhikistan and Pamir. One of the most active earthquake zones extends from East to West on the Karatag--Fayzabad--Obi-Garm--Tadzhikabad line along the contact line between the Paleozoic structures of central Tadzhikistan and the Mezocenozoic deposits of the South-Tadzhik Depression. Found in these zones are outlets of the deep hot-water, and frequently radioactive, springs of Khodzhi-Obigarm, Shaambara (near Stalinabad), Obi-Garm and a number of springs in the Pamir. These facts testify to the youthful age of the relief and the continuing mountain-building processes.

Minerals

Before the revolution, the mineral deposits in what is now Tadzhikistan had not been thoroughly studied. There were several types of minerals, but systematic exploitation was restricted to coal and oil alone. Up to 50 different kinds of minerals have been discovered under the Soviet regime, and 20 of them are being extracted; the mineral reserves of 300 different deposit places have already been estimated.

The minerals found in the republic consists of polymetals, rare metals, and nonmetallic minerals. The zinc and lead reserves in Tadzhikistan compare favorably with many of the largest such deposits in the Soviet Union. The list of rare metals found in the republic includes strontium, antimony, wolfram, arsenic, bismuth, tin, mercury, molybdenum, cadmium, etc. The nonmetallic minerals comprise a similar variety: fluorspar, asbestos, mica, mountain crystal, optical fluorite, talc, barite, lapis lazuli, and many others.

Almost all the known mineral ores are concentrated in 3 mountain areas: in the North of the republic, in Central Tadzhikistan, and in the mountain ranges of the Pamir-Darvazskiy Mountain System.

Conspicuous from the viewpoint of the variety and quantity of mineral ores is the northern mining area (Kuraminskiy and Mogoltau ranges). Here the most important minerals are polymetals (zinc and lead) as well as rare metals (bismuth, arsenic, and wolfram). Many of the Kuraminskiy range deposits are complex in nature; their ore contains not one but several different metals (for example, lead, zinc, silver, and cadmium) requiring complicated technological methods for their extraction. The Kuraminskiy Mountain Range, just like the Central Ural, is not high, and its deposits are found below 2,000 m of absolute height [absolutnaya vysota], in the Mogoltau Range at less than 1,000 m. That is why the Arabs considered Karamazar (the southwestern part of Kuraminskiy Range) the center of the silver and lead industry. The Russians became aware of its riches in the second half of the nineteenth century, but no use was made of them at that time. Karamazar has now become one of the largest mining industry areas.

Next in importance is the central mining area (Gissar, Zeravshan, and Turkestan Ranges). Found in that area were deposits of rare metals, coal, and nonmetallic minerals. The most important among them are the large antimony deposits of Dzhizhikrut in the Gissar Range. There are also wolfram, arsenic, tin, mercury, etc. Much interest was aroused by the discovery of vast deposits of high-quality crystals of optical

fluorite, a highly valuable raw material for the optical industry, within the natural boundaries of Kuli-Kalon (Zeravshan Range). All these deposits are concentrated within a vast mountain massif at a high altitude (in some places above 3,000 m) which makes access to them quite difficult. The Takobskiy fluorspar deposits, found at a comparatively low altitude (1,650 m), near Stalinabad, are some of the rare exceptions. The development of that rich mining area calls for the construction of a railroad line in its central part. (There are several alternate plans for such a railroad line; the most feasible project would be a Samarkand-Takfon railroad line).

Still more inconvenient is the location of the third mining area, the Pamiro-Darvazskaya. Optical quartz, mica, asbestos, and talc deposits were found in the Vanchskiy, Darvazskiy, and Shakhdarinskiy ranges. Lying at an altitude of 3,800 - 4,700 m above sea level, these deposits are among the highest in the world. Gold deposits are found also in the Pamir and on the eastern fringes of the South-Tadzhik Depression.

Connected with the rocks of the Mesozoic and the Tertiary Period is the formation of fuel (oil, coal and shale oil) and nonmetallic minerals (salt, building materials, etc.). Most of them are located in lower-altitude areas and under favorable economic conditions. In some places the deposits had been raised to considerable altitudes by Alpine tectonic movements, as in the case of the Ravatskiy coal deposits, the largest in Central Asia.

Among the minerals of that group already discovered and prospected are coal, lignite, coal, gas, ozocerite (mineral wax), table salt, phosphorites, shale oil, peat, and numerous construction materials.

The coal was formed in the Jurassic Period when a warm and humid climate prevailed in Central Asia and the shores of the sea gulfs and lagoons were covered with dense forests of palm trees, giant ferns, and equisetums.

Coal is found in many parts of the country, but the major deposits are concentrated in the valleys of the Zeravshan River and its tributaries. Eighty percent of the several billion tons of the geological coal reserves are concentrated in the Ravatskoye deposits in the Yagnob River Valley near Takfon, at an altitude of 1,500 to 2,500 m. Another large deposit is the Kshtut-Zauranskoye located in the same mountain area and almost at the same altitude. The coal found in these deposits is among the best in Tadzhikistan with a very high thermal efficiency (7.5 - 8.5 thousand calories). Most of the coal found in Ravat can be converted into coke for metallurgical purposes. But these deposits have not yet been exploited due to the lack of railroad facilities.

In the North, the Shurab is an important coal basin. It is situated at a low altitude and is easily accessible (it is connected with the Fergana railroad by broadgage rail tracks). The Shurab liguite, which has a high thermal efficiency (4,500 to 5,500 calories) is being mined; it is used throughout Tadzhikistan.

On the southern slope of the Gissar Mountain Range are the Zidinsk coal deposits containing good quality coal (with a thermal efficiency up to 7,000 calories) but those deposits are not exploited because of the high altitude and the lack of reliable roads leading up to them.

The other coal deposits are small and of strictly local significance.

Oil deposits originating from Paleogenic residues were found in the northern part of the republic (the KIM and Nefteabad oil fields) as well as in the south, in the Vakhsh River Valley (Kyzyl-Tumshuk). Geological structures indicating possible oil reserves were found in the same areas, and they will be prospected within the next few years.

Mined near the KIM oilfields is ozocerite (mineral wax) which is a paraffin-base oil derivative. It permeates the shell rock and sandstone strata to a great depth.

The salt deposits were formed under the conditions of the dry continental climate prevailing in the middle Mesozoic and Tertiary periods. The salt reserves in the republic are fabulously great. The two bald mountains near Kulyab, Khodzhasartiz and Khodzhamumin, each about 1,000 m high or more, consist almost entirely of pure rock salt. The salt reserves of these mountains above the surface alone is estimated at approximately 70 billion tons. But they have not been touched yet. Salt deposits are available also in other parts of the country, closer to the industrial centers (Kamyshkurgan, for example) where they are being exploited.

Phosphorites, sulfur, and oil shale are found in a number of places in the South-Tadzhik Depression, but their reserves are not very large.

Among the other types of raw materials belonging to the mentioned group and available in quantity are the following construction materials: gypsum, limestone, glass sand [Steklo'niy pesok], fire clay, marble, granite, an abundance of loess, gravel, etc. Construction combines and plants are operating in the country on the basis of these raw materials.

The mineral water sources of Tadzhikistan are found along the tectonic crags; the water is mostly hot, which is due to the dying volcanic activity of the Tertiary and Quarternary periods. The 2 famous hot water

sources in southern Tadzhikistan are Khodzhi-Obigarm, North of Stalinabad (radioactive, with a water temperature between 42° and 56°), and Obi-Garm, East of that city, (hydrosulfuric, with a water temperature between 35° and 42°). Sanatoria were built near both springs.

Pamir is famous for its numerous thermal springs (temperatures between 38° and 85°). These springs are located in poorly-exploited areas, at absolute altitudes between 2,000 and 4,500 m, and are used in a primitive manner by the incoming population.

A group of cold mineral-water springs was found in the Khodzhi-Sangkhok community on the southern slope of the Gissar Mountain Range at an altitude of more than 3,000 m. Only one of those springs, located near the Anzobskiy Pass automobile road, is being used.

Among the highly valuable minerals are the medicinal muds. Very popular among the sufferers from rheumatic and skin diseases is the Oksakon Mud-and-Salt Lake, Northeast of Leninabad; a special sanatorium for mud cures was built there. Becoming famous also are the mud-and-salt springs at Khodzhamumin Mountain near Kulyab, which are still used in a primitive way.

The various ore and nonmetallic mineral riches are scattered all over the country, forming 5 more or less outlined territorial complexes:

1. Karamazarskiy — polymetals, rare metals, fluorspar, etc;

2. Tadzhikako-Fergansky — lignite, oil, ozocerite, rock salt, and construction materials;

3. Zeravshansko-Gissarskiy — rare metals, coal, fire clay, fluorspar, thermal and mineral waters;

4. South-Tadzhik — coal, oil shale, peat, rock salt, phosphorites, construction materials, and thermal waters;

5. Pamiro-Darvazskaiy — optical quartz, asbestos, shale, rare metals, and thermal waters.

There are possibilities in these areas for the development of different branches of the mining industries as well as industrial complexes.

Climate

The climate of the Tadzhik SSR, as of any other country, is determined by the general system of circulation in the atmosphere and, to a large extent, by the relief. Tadzhikistan is located in the southernmost latitudes of the USSR, within the higher pressure belt of the northern hemisphere. Precipitation is almost never formed within that belt, and the moisture coming from the oceans and seas is very limited due to the long distances. (High air pressure does not facilitate the formation of precipitation, as the air vapors coming down from the cold upper layers of the atmosphere to the lower and warmer layers expand and move away from the dewpoint). The intensive solar heat to which the earth's surface is subjected in the summer months produces much evaporation which is not compensated for by precipitation; that creates conditions for the formation of intracontinental deserts in the dry belt. (The Karakum, Kyzylkum, Takla-Makan, Gobi, and other deserts extend along the high air pressure belt across all of Middle and Central Asia). That is why the dry belt has left its imprint on the entire natural appearance and climate of the republic, which may be characterized as highly continental.

At the same time, the Tadzhik territory is affected by outside air currents, mostly from the Northwest, which, while bringing humidity from the West, also facilitate the penetration of cold air masses from the North.

Almost all the precipitation in Tadzhikistan comes from the direction of the Atlantic Ocean, the Mediterranean, and the Black Sea. It is brought in by cyclones in wintertime. In the summer, the weather in most of the country is dry, and there are no rains. But even in wintertime the humidity is very limited as the air masses moved in by cyclones have to travel long distances before reaching Tadzhikistan, and most of the moisture is lost on the way.

In addition to cyclones, Central Asia is periodically penetrated also by northern and northeastern air masses originating in the Arctic, mostly during the cold season of the year when a powerful anticyclone movement is built up over eastern Siberia and branch off to the West. These penetrations produce considerable though temporary cold spells in wintertime as well as early autumn and spring frosts.

The climatic differences within the territory of the republic are determined by local conditions: altitude, exposure of the mountain-range slopes, and partly by the location of the various districts in

the South or North of the country. Such differences are particularly pronounced between the lower valleys (including the foothill valleys) and mountain areas and the East Pamir Upland. The following figures present a general characteristic of the climatic features:

Localities	Altitude above sea level (m)	Temperature		range of extreme temperatures (degrees)	Precipitation (mm)
		January	July		
Ayvadzh	340	2.6	32.2	65.2	140
Khodzhi-Obigarm	1,807	-3.1	22.1	52.7	1,389
Murgab	3,640	-17.7	13.6	78.0	73

The lower zone (Ayvadzh) is very warm and arid, the mountainous (Khodzhi-Obigarm) zone is temperate and considerably humid, and East Pamir is a cold, dry, and sharply continental area.

The lower zone contains broad valleys, foothill plains, and in parts also low mountains. Its upper border runs at an approximate altitude of 1,000-1,200 m. From the standpoint of climatic and vegetation, it is primarily a dry subtropical zone, which can produce the most valuable southern cultures under irrigation.

The summers there are very hot, not less so than in Cairo (Egypt): the mean temperature in July does not exceed 28°, and in some places 32°. The duration of the frostless period is 6 to 7 months, and in well-sheltered valleys up to 8 months. The total temperature for the period, when the average daily temperature is not below 15°, amounts to 4,000° and the southernmost valleys 5,000°. (Cotton seeds usually begin to sprout under such daily temperature, and this figure is therefore taken as the beginning and the end of the vegetation period in the subtropics) That is about the temperature required by thin-fiber cotton, jute, sugar cane, and citrus fruit. The high summer temperatures are accompanied by a higher degree of air dryness and an almost total lack of rain for many months. The annual precipitation is less than 200 mm but increases to 400-600 mm with rising altitude, so that in the upper part of the zone it is possible to engage in agriculture without the benefit of irrigation.

The winter in the lower valleys is humid and warm. The average January temperature is somewhat above 0°, and the daily temperature is usually considerably higher. Such conditions do not facilitate the formation of a permanent snow cover on the ground and are therefore favorable for the development of animal husbandry, inasmuch as most of the cattle spend the winter grazing in the lower valleys.

Existing along with the positive climatic features of the lower zone are also certain negative features which tend to complicate the development of a subtropical type of agriculture.

Cold spells in the winter occasionally reach -24° to -28°, and they happen to penetrate the lowest subtropical valleys at a time when the mountain slopes are not affected by such spells. This phenomenon is called temperature inversion and the reason for it is that the cold air masses coming from the North drift into the lower valleys and do not rise very high from there. (A typical example of temperature inversion was recorded on 13 January, 1949, in South Tadzhikistan: the morning temperature in Stalinabad was -24°, at the Anzobskiy Mountain Pass -8°, and at an altitude of 1,700 m above Stalinabad +3°.). Excessively low temperatures have an unfavorable effect on valuable perennial cultures. Late frost frequently occurs in the spring and early frost in autumn. The late spring frosts are especially destructive after the warm weather has set in and the plants have begun to grow and even blossom.

Peculiar also are the winds in this zone.

Very common are the foehns, the dry and warm winds blowing from the mountains down into the valleys, particularly in the cold season of the year. They rapidly warm the air, melt the snow, and bring about a premature growth of the vegetation which later usually suffers from the cold. During the foehn season the weather is as warm in December as it is in summer.

The Garmsil', a hot wind blowing mostly in the lower valleys bordering on deserts, is a normal occurrence during the warm season of the year. The garmsil' raises the temperatures to 45° - 47° in the shade. The extreme high temperature is accompanied by extreme dryness (the relative humidity drops to 10% and even 5% from the average of 40%). Under these conditions, the plants frequently lose their capacity to maintain a normal evaporation of moisture and dry up from the excessive loss of moisture.

Some of the winds are of local significance. The Afganets, which blows from the South, is a familiar phenomenon in the valleys of the Southwest, and the Perganets, a western wind, blows through the "gates" from the direction of the Turanian deserts. These winds are very strong, they carry huge masses of dust, and frequently cause mechanical damages to fruit gardens and young crops.

The climatic conditions of the mountain areas are markedly different from those of the subtropics. The summers there are cooler and the frost-free periods shorter. The winter temperature is more uniform, without sudden changes to warmer periods or to cold snaps. The snow cover is stable and, in some high valleys, very thick.

The mountain valleys, extending from West to East and sheltered from the cold northern winds by high mountain ranges, are considerably warmer than they would otherwise be at a similar altitude. Thus, in the Zeravshan valley, at an altitude of 1,522 m (Ayni), the summer temperature is 24.4° and the winter temperature -2.3°, while in the Gunt River Valley, at a 2,080 m altitude (Khoreg), the temperatures are, respectively, 22° and -7.1°. These are closed-in valleys. Plants requiring warm weather can grow there at unusual altitudes: rice, up to 1,800 m; sesame and clover ["klevashchina"], up to 2,000 m; and water melon and cantaloupe, up to 2,400 m. Fruit trees grow at very high altitudes; mulberry and apricot trees grow at altitudes which in the Alps are usually covered with permanent snow and ice.

Microconditions are more important in the high-altitude areas than on the plains. For example, it is important that the collective farms know whether to use the sunny or the shady slope for planting, gardening, hay procurement, and cattle grazing. Wheat does not always ripen on the shady slopes, as they do not get sufficient sunshine; but the latter usually produce more grass, better hay, and pastures than the sunny slopes. That is why production is frequently distributed unequally on opposite slopes of one and the same valley.

Precipitation in the mountain areas is considerably better than on the plains. The precipitation brought in by the cyclones is intercepted by the mountains as by screens. As the air rises and condensation improves, the humidity rises up to 2,500 - 3,000 m and then drops again.

But even the mountain areas do not get an equal amount of precipitation. The slopes of the outside mountain ranges lying in the way of the cyclonic air mass movements get more moisture. This is particularly true of the mountainous part of South Tadzhikistan located between the

Gissar and Darvazskiy ranges and representing a large corner open to the Southwest. An annual precipitation of 500 mm to 1,000 mm is usual in that area, and in some of its parts it goes up to 2,000 mm. Less moisture is received by the northern slopes of the Turkestan Range (up to 400 mm) and the half-sheltered valleys of the Zeravshan River Basin (200-300 mm). Little precipitation reaches the faraway valleys of western Pamir (less than 200 mm), which are closed in by the mountains.

The relatively well-moistened large part of the mountain area and the precipitation occurring in the first half of the summer (including June) are of great economic importance. The land where the annual precipitation is over 400 mm is under agricultural cultivation that requires no irrigation. The most moistened part of the south is covered by forests, and the upper belt of the mountains by alpine and subalpine meadows, which are excellent summer pastures.

The climate of the high Pamir upland is very severe. The average January temperature in Murgab is -17.7°, and at lake Kara-Kul' -19.4° (the lowest temperature in Tadzhikistan). The minimum temperature is -50° (at lake Kara-Kul'). The summers are short. In Murgab the frost-free period lasts 2 months on the average, and at Lake Kara-Kul' it is practically nonexistent. During the summer days, however, the lower layers of air get quite warm, and the summer weather is warmer than could be expected at such an altitude. The average July temperature in Murgab is 13.6°, and the highest temperature is 31°. This makes it possible in some places to raise certain cultures which have very short vegetative periods and are resistant to frost.

Eastern Pamir is exceptionally dry. Almost all of the air humidity is intercepted by the Academy of Sciences Range, the Darvazskiy Range, and others, through which the already dry air masses flow to the Pamir. The annual precipitation in Murgab is 73 mm and at Lake Kara-Kul' 62 mm. The major part of the territory is not covered with snow even in winter-time. As a whole, eastern Pamir is a vast highland desert with year-round pastures.

Rivers and Lakes

Tadzhikistan is covered with a dense network of rivers representing the upper sections and tributaries of the Amu-Darya, Syr-Darya, and the Zeravshan. The rivers, as a rule, have an abundance of water, but only part of it is used for irrigation purposes in the republic. (In the case of the Vakhsh river, for example, only 6% of its average monthly flow is used for irrigating the Vakhsh Valley fields). Most of the water flows to Uzbekistan and Turkmenia, where it is used for irrigation, or reaches the Aral Sea through the large rivers.

The characteristic feature of most the rivers is their steep drop. The rivers usually flow from altitudes of more than 1,800 - 3,000 m down to the plains, which are located at altitudes of 300 - 1,500 m. They originate in the mountains as turbulent streams flowing along a common bed among craggy pebble terraces or along corridors with precipitous rocky walls.

Full-flowing and sheer-dropping, these rivers contain an enormous reserve of power. The Tadzhik SSR has about 1/2 of the potential hydroelectric power of Central Asia. The total capacity of the Tadzhik rivers, at the prevailing annual rate of water flow, amounts to 26,000,000 kw. The deep canyons, resting on hard rock in a number of places, are suitable for the construction of large water reservoirs and power plants.

The Tadzhik rivers vary as to their sources, behavior, and economic importance. Most of them originate in mixed glacier-snow sources. They originate in the glaciers and snow which are constantly accumulated in the high mountains. The Pamir-Darvaz heights are almost entirely covered with glaciers. The major tributaries of the Amu-Darya originate there. There are many glaciers and snow masses also in the central mountain massif. The Zeravshan and some of the Syr-Darya's left-side tributaries originate there.

The rivers fed by the glaciers and snow have a high waterline in summertime when the glaciers and snow begin to thaw. The largest increase in the water volume occurs in the period from June to August and the high-water mark, reached in July, coincides with the time when the irrigation of cotton and other cultures requires the maximum amount of water. There is little water in those rivers in the fall, winter, and spring.

The rivers which are not connected with glaciers and permanent snow (there are few of them in Tadzhikistan) are small and carry little water. They originate in the low mountains and are fed by the winter accumulation of snow and by rains. The turbulent overflows occurring between March and May are followed by sharp drops in the water level during the summer months. The economic importance of these rivers is quite limited. They are found in the North, in the Ura-Tyube area, as well as in the Gissar and Kyzylsuyskiy valleys.

This type of rivers is characterized as the "sel'" type. A "sel'" is a liquid-mud-stone mass moving rapidly down the river bed to a broad valley and spreading out beyond the river bed. A sel' usually occurs after a strong downpour in the mountains and sometimes causes enormous damages and hardships to the population. Of some importance are the

small spring-fed rivers flowing at the foothills of the Kuraminskiy and Turkestan ranges, in the mountains between the Gissar and Vakhsh valleys and in the Bishkent Valley; they usually irrigate several dozen, and sometimes even several hundred, hectares of crops each.

The Alay-Turkestan Mountain Chain on one side and the Gissar Mountain Range on the other divide the country's river network into 3 systems: the Syr-Darya in the North, the Zeravshan in the center, and the Amu-Darya in the South. Eastern Pamir also has 2 basins filled with lakes and a small part of the river Markansu, which flows into China.

The Syr-Darya cuts across the length of the Fergana Valley. Prior to the construction of the Big Fergana Canal, that river had been used very little for irrigation purposes. At present, the Big Fergana, the North Fergana, and the Verkhnedal'verzinskiy canals and a number of pumping installations are used to supply 50 cu m of water per second from that river for irrigation purposes in summertime. When the Kayrakkum water reservoir is completed, the amount of Syr-Darya water used for irrigation will be increased many times. A major part of the cultivated land in the valley is now irrigated by the Syr-Darya tributaries flowing down the Turkestan and Kuraminskiy mountain ranges. The largest among the left tributaries are the Isfara, the Khodzhabakyrgan, and the Aksu. Compared with the Syr-Darya, they are small rivers: their total annual drainage amounts to 900 million cu m, whereas that of the Syr-Darya is 15 billion cu m. These rivers are fed by glaciers and snow and are almost entirely used for irrigation purposes during their midsummer high-water level period. Flowing down the Turkestan Mountain Range, in addition to the above-mentioned rivers, there are several other small rivers that are fed by snow or soil water and are used to irrigate such large oases as Shakhristan and Ura-Tyubin. The water of these rivers is almost entirely used for irrigation purposes, but, since the amount is insufficient, a waiting-line has been established for its use.

Originating in the Kuraminskiy mountains are small spring-fed streams which are used for irrigation on an area between the mountains and about 20-30 km for the Syr-Darya. Springs are found also on the plain along the river's right bank, such as the Samgar, which irrigates several hundred hectares of crops.

The upper part of the next large river, the Zeravshan (Matcha), crosses about 300 km of Tadzhik territory. It originates in the Zeravshan Glacier atop the Match Mountain System and flows along a deep and narrow valley between the Turkestan and Zeravshan ranges. On the left side it

is joined by 3 large tributaries: the Fandar'ya, with its own tributary; the Yagnob; the Kshtutdar'ya; and the Magiandar'ya. They flow down the Gissar Range and divide the Zeravshan Range into several massifs by narrow canyons. The Zeravshan Range is also the target of over 100 other small streams.

In the Tadzhik mountains, the Zeravshan collects much of its water. Part of this it releases to the Pen,hinkent oasis of Tadzhikistan, but most of it flows to the Samarkand and Bokhara oases in Uzbekistan; there the river is used almost entirely for irrigation and does not reach the Amu-Darya, whose tributary it used to be.

The Zeravshan and its 3 major tributaries flow in deep canyons, which make it difficult to divert the flow by a gravity process. The agricultural lands are irrigated by small-stream tributaries when much of the water on the elevated land and open spaces has already been used up.

The Zeravshan and its tributaries have enormous reserves of hydroelectric power. Some places in the deep canyons among the precipitous cliffs are excellently suited for water reservoirs. The production of electric power in the Zeravshan Basin would be expedient in view of the variety of minerals available there and the central location from which power could be transmitted to other areas of the country.

The southernmost river in Tadzhikistan, the upper part of the Amu-Darya, collects 3/4 of the surface drainage in the republic. The 2 major rivers comprising the Amu-Darya are the Vakhsh and Pyandzh. The latter, formed by the confluence of the Pamir and Vakhandarya rivers, flows along the USSR-Afghanistan border. It makes a gigantic curve and leaves the mountain area in the Moscow administrative rayon. In West Pamir, the Pyandzh is joined by 4 large tributaries on its right bank: the Gunt (with its tributary, the Shakhdara), the Bartang, the Yazgul' and the Vanch. Between the Vanch and Vakhsh rivers the Pyandzh is joined by several other small but economically important tributaries. The Kafirnigan tributary empties into the Amu-Darya in Tadzhikistan territory at a point below the Vakhsh.

The mountainous portions of the Pyandzh and the Zeravshan, are not used for irrigation as they flow through narrow, deep valleys. Their water becomes usable for irrigation purposes only within the Kulyabskiy Plain. The upper tributaries of the Pyandzh are fed by glaciers and snow, become flooded in summer time, and leave their beds. This makes some of the valley impassable during that period. The high terraces are irrigated not by the major rivers, but by their tributary streams. These

steeply dropping rivers develop enormous power. (According to approximate estimates, the average annual power capacity of the Pyandzh River and its major tributaries amounts to over 11 million kw.). The Bartang, Gunt, and Pamir rivers originate in the lakes.

The second largest river comprising the Amu-Darya is the Vakhsh (which means "savage" in Tadzhik). It originates in Kirgizia and flows along the broad Alay Valley where it is called Kyzylsu; the next large portion of the river, between the tributaries Muksu and Obikhingou, flows within the Tadzhik borders and is called Surkhobom, and the entire lower portion is called the Vakhsh. The total length of the three portions is about 650 km. (In the Alay Valley the Vakhsh washes away red chalky clay substances and sandstone which make the water appear red, and that is why the Kirgizians call their portion of the river Kyzylsu, and the Tadzhiks call theirs Surkhob. Translated, both of these terms mean "red water".)

The Vakhsh collects about 3/4 of the entire water drainage in the republic. One of its tributaries, the Muksu, gets its water from the Fedchenko Glacier, and the other, the Obikhingou, is fed by the Garmo Glacier, which accounts for the glacier habits of the Vakhsh River. The fluctuation range of the Vakhsh water discharge is enormous: in the summer it is 1,500 to 2,900 cu m per second, and in the winter 150 to 250 cu m.

Just like the other large rivers, the Vakhsh and its large tributaries flow in very deep valleys and their water cannot be used to irrigate the fields; the latter are irrigated only by small secondary rivers. Only when it leaves the mountains, not far from the Pyandzh River, does the Vakhsh become the only source of irrigation for the broad Vakhsh Valley.

As a power and irrigation source, the Vakhsh is an important river in the republic. The deep canyons and rocky soil found along the course of the Vakhsh and its tributaries are suitable for the construction of reservoirs and powerful hydroelectric plants. The middle portion of the river could be used as a suitable place for hydroelectric installations, particularly the "Nurekskaya Petlya" [Nurekskiy Loop] with its canyon-type banks. Unlike the Pamir rivers, the Vakhsh cuts across southwest Tadzhikistan, which is better developed economically than the Pamir. Two large hydroelectric plants, Perepadnaya (on a canal) and Golovnaya, are already under construction along the lower course of the Vakhsh.

The Kafirnigan River, flowing west of the Vakhsh, has a discharge rate of less than 1/6 that of the Vakhsh. It originates on the southern slope of the Gissar Mountain Range, crosses the eastern part of the Gissar Valley, and continues in southwesterly direction until it empties into the Amu-Darya. Its tributaries, the Dushambe and the Khanaka, together with the Karatag (one of the Kurkhadarya tributaries) irrigate the major part of the Gissar Valley. But they no longer have sufficient water to meet the agricultural demands in that rich valley, and the planning for improved water supply will inevitably include the Kafirnigan. The lower Kafirnigan will have to meet an increased demand for water, particularly in the Beshkent Valley, where it is planned to irrigate large tracts of new land.

Among the other rivers, mention should be made of the Kyzylsu and its tributary the Yakhsu, which irrigate southeast Tadzhikistan. These small rivers originate in the low mountains, are fed by snow and rain and reach their highest water level in the first half of the summer. In the second half they become very shallow, their water turning brackish in some places. That area has no adequate supply of irrigation water.

There are comparatively few lakes in Tadzhikistan, and they vary in regard to origin, nature, and potential economic value.

Several lakes of tectonic-glacier origin are found in the large closed-in depressions of East Pamir. The largest of them, the Kara-Kul', covers an area of 364 sq km and is located at 3,914 m above sea level; its shores are still covered with thick layers of geological (tertiary) ice, and there is apparently no life in it. Two smaller lakes of that type, Lake Shorkul' and Lake Rangkul', located in a different depression, are rich in salt and fish.

There are also lakes of glacier-morainic origin, and one of them, Lake Zorkul', is in the Pamir River Valley. Rock-filled lakes ["zaval'niye ozera"] are found in 2 valleys along the border between East and West Pamir. The largest of them, Lake Sarezskoye, came into being in 1911 in the Murgab River Valley; it was dammed up by the slides from a huge mountain. That lake, over 60 km long and 500 m deep at the dammed part, could provide constant water pressure for a hydroelectric plant of one million kw capacity. Another lake of that type, but of prehistoric origin is Lake Yashil'kul' in the Gunt River Valley. Located at the upper reaches of the Pyandzh river tributaries, all these lakes play an important part in the water system and abound in fish.

Located in the Gissar Mountain Range, at an absolute altitude of 2,176 m, is the picturesque Lake Iskanderkul'. As a natural water reservoir of the Fandarya (Zeravshan's tributary) river system with an annual discharge of about 600 million cu m of water at the overflow point, it can provide power for a large hydroelectric plant or a group of them at its cascades. There are similar but smaller lakes within the Magiandar' (Zeravshan's tributary) river system and in other parts of central Tadzhikistan.

Small salt-and-mud lakes are found mostly on the foothill plains, and there are small ancient lakes [*ozera-staritsy*] abounding in fish and planktonic fowl are in the lower valleys of the large rivers.

Soil

The soil in Tadzhikistan, just like the climatic conditions with which it is closely allied, is characterized by a high degree of diversity. As in the case of the mountainous relief, the major differences in the soil structure can be clearly traced by the elevation zones, or belts, which frequently change over short distances. The territory of the Tadzhik SSR may be divided into the following major soil zones: (1) gray desert soil (syerozem) (the syerozem zone consists of 2 belts, the desert and desert-steppe belt), (2) mountain-steppe and forest-steppe soil, (3) subalpine mountain-meadow and meadow-steppe soil, (4) Alpine mountain-meadow and meadow-steppe soil, and (5) high mountain desert and desert-steppe soil.

The gray desert soil, most typical of central Asia, is the most important economically. It covers the entire lower part of the country. That zone includes more than 1.4 million ha of arable land which, according to estimates by soil experts, accounts for about 80% of all the arable land in the republic. The gray desert soil is formed in a dry hot climate under a cover of spring grass, which grows for a short time and dries up rapidly, depositing an insignificant amount of organic residue in the soil. This soil contains little humus. The name syerozem derives from the gray color of the topsoil. A cross section of the country's relief shows that this type of soil is far from uniform as far as its properties are concerned. There are 3 types of grey desert soil: light, ordinary, and dark.

The light soil, which is of varying mechanical consistency, covers only the lower valleys up to 600 m above sea level: the Fergana, Vakhsh, Kafirnigan, Kirovabad, and other valleys. Such soil is no longer seen in the Gissar Valley, which is at an altitude of 700 m. The light syerozem is almost devoid of any humus layer (less than 1% humus). It has no

definite structure, is somewhat dusty, and has a high lime content. But despite that, it is very fertile. That fertility depends on the high temperature of the vegetation period when the microorganisms convert the organic matter into minerals which are accessible to plants. This high fertility, however, is not an exclusive natural feature of the soil; it is brought about also by a number of agricultural measures: irrigation, grassland crop rotation (which, is important for soil structure) and fertilization. Light syerozem soil is the gold reserve of the republic: it produces the long-fiber varieties of cotton, jute, and the other southern cultures native to the country. That is why much attention is devoted to the discovery of new suitable lands in the lower part of the syerozem belt. Such potential land is now available in the lower valleys in the form of swamps, salt marshes, large and unirrigated high-desert terraces, as well as other lands containing gypsum and gravel which can now be exploited thanks to modern scientific and technological methods.

Extending above the light syerozem soil is the ordinary syerozem -- in the Zeravshan, Gissar, and Yavan valleys and in still higher places. On the foothill plains of the northern slope of the Turkestan Range that soil rises to an altitude of 1,000 m. Covering the moisture slopes, which get an annual precipitation of over 300 mm, that soil is richer in humus (up to 2.5%) and has a better structure than the light syerozem. Unlike the latter, the ordinary syerozem is seldom saline, inasmuch as the subsoil water of the higher altitudes is fairly deep. The land covered with ordinary syerozem is used for both irrigated and unirrigated agricultural crops. The required humidity level is unstable but the availability of vast tracts of land suitable for large-scale mechanized agricultural operations makes agriculture profitable.

Still higher up is the dark syerozem soil. It rises up to 1,500 m above sea level on the northern slope of the Turkestan Mountain Range, and even up to 1,800 m in the warm southern valleys. The annual precipitation at that altitude is between 400 and 600 mm, which tends to increase the humus content (up to 3.5%) and improve the structure of the soil. The dark syerozem soil belt is suitable for agriculture without irrigation. True, it is somewhat less suitable for the use of machinery in view of the rugged terrain. It is possible to find additional land for agricultural production in the dark syerozem soil belt.

The syerozem zone is followed by a zone of mountain-steppe and forest-steppe soil. In the dry North, this zone is covered with dark gray, dry-steppe soil, in the more humid South the soil is carbonate brown, and still higher it is of the ordinary brown mountain-forest type. The annual

precipitation up there is 1,500 - 1,800 mm. The soil of that zone has a good structure, contains much humus (up to 6% in the ordinary brown mountain-forest type) and is sufficiently fertile without artificial irrigation. The land of this zone has therefore been intensively ploughed up, particularly in places once covered by forests, in preparation for unirrigated agriculture. The destruction of the forests has brought soil erosion on the steep slopes. The important problem in the zone is reforestation and the planting of fruit gardens even if some of the croplands have to be reduced for that purpose. The reserve ploughland has already been used up.

The subalpine and alpine zones cover the highest parts of the mountains. Those zones include large areas in the upper parts of the huge Gissar, Alay, Petr Pervyy, and Darvazskiy ranges and also parts of the West Pamir ranges. These are cool zones with excess moisture. The carbonates in these zones have, as a rule, been lixiviated (they do not boil under the surface hydrochloric acid) and have a higher humus content. They are covered with summer pastures.

Found in the subalpine zones are plots of unirrigated land where barley grows at altitudes up to 3,200 m. The less lixiviated varieties of mountain-meadow and steppe land are used for ordinary crops.

The colder alpine zone is exclusively grazing territory with mountain-meadow type soil; the peat-formation in that soil is due to the inadequate mineralization of the residues of the once lush vegetation there.

The subalpine and alpine zones can be used not only for grazing cattle in summer but also for its upkeep all year round, especially with the support of nearby agricultural sources.

The vast zone of high-altitude desert steppe and desert soil covers 1/3 of the republic's territory. It includes the entire East Pamir upland and the mountain-range tops of central Tadzhikistan. This zone is characterized by little annual precipitation (below 100 mm) and low temperatures. Much of that soil is made unusable by such extraneous elements as glaciers, snow banks, moraine, and accumulations of rock tallus. The soil is, as a rule, filled with detritus and not very productive.

Most of the East Pamir soil is desert-type carbonaceous soil which contains little humus; it resembles the light syerozem soil of the lower valleys, but differs from it in its biological properties and economic importance. The broad floodlands of the East Pamir rivers, with their

soil water close to the surface, are covered with peaty-meadow soil which is frequently saline and produces fairly good grass. This is the better pastureland of East Pamir. Agriculture on that land is made very difficult by the cold weather, low precipitation, and insufficient water.

Vegetation

Tadzhikistan's location in the subtropical zone, within the botanical-geographical area of the Ancient Mediterranean, and its complex mountain relief, which makes for sharply dissimilar soil and climatic conditions, account for the great variety of its vegetation. There are 4,500 species of phanerograms and sporophytes alone.

The high-altitude zonality is strikingly revealed in the grandiose vertical profile of Pamir-Alay, between the absolute altitude of 300 and 400 m in the South and North of the republic and between 6,000 and 7,000 m in the eastern areas and Pamir. There the soil and botanical belts change in accordance with the height and location of the mountain ranges, and in accordance with the precipitation and falling temperatures. The deserts and steppe-like semisavannahs yield to peculiar deciduous forests which, in turn, yield to moisture-requiring maple and walnut forests or to evergreen "archevnik" which, still further, is followed by thistle-covered steppes and meadows and alpine wasteland extending to the plain-field area (nival'naya oblast). Wedged into the Pamir, which is shut off from humid air currents, between the alpine and plainfield areas are the vast subalpine deserts, which rise to an altitude of 3,600 to 4,200 m.

Despite the diversity of vegetation in Tadzhikistan, just as in the neighboring Iran and Afghanistan, the predominant vegetation features are, on the one hand, ephemeral groups of semisavannahs which come to life in the spring and, on the other drought-resisting grasses and under-brush which determine the surface of steppes, deserts, tragacanths and wild thyme districts. Only about 4% - 4½% of the republic's area is covered with trees and shrubbery, but even these, like the grass vegeta-tion, are dominated by drought-resisting plants. The contemporary cor-relations between arboreal and herbaceous vegetation as well as between mesophytic (moisture requiring) and xerophilous (drought-resisting) plants were conditioned not only by the direct influence of arid con-ditions but also by the age-old activities of man who used to destroy arboreal vegetation on vast areas of the land.

The common feature of the arboreal vegetation, particularly the drought-resisting type, is its thinly scattered growth. The vast spaces are dotted with scattered single trees or equally scattered groups of

trees followed by treeless areas. This type of forest structure is due not only to the influence of man, but also to its own biological characteristics. In dry weather, when most of the precipitation occurs in the winter and spring, most types of trees develop a vast surface root system which is ideal for intercepting the surface water and the most fertile particles of soil by its numerous root ramifications. This accounts for the scattered growth of the trees, the luminosity of the air among them and, consequently, also an abundance of fruit and nut mangroves. The above-mentioned characteristics of the root system also serve to make the forests an important element in the prevention of soil erosion. The forests in Tadzhikistan are not numerous, but they are highly diversified, consisting of about 200 different species of trees and brushwood. The latter are highly diversified from an ecological point of view, and are found in almost all high-altitude belts. Even at altitudes above 3,000 m and up to 3,500 m, as in the case of the Gissar and Turkestan mountain ranges, one still comes across creeping club moss, clusters of Gissar dog rose plants and honeysuckle, while the Kashgar barberry is found in the Pamir at an altitude of 4,000 m.

The drought-resisting arboreal and brushwood-type plants, particularly jangal, shiblyak, and archevnik, represent a sparse vegetation typical of the landscape of large open spaces. The jangals, or sandy forests growing on ancient alluvial sands, consist of short black and white haloxylon, cherkez, kandyma, and sandy acacia. The shortlived vegetation growing there in the spring (mostly sedge) represents excellent fodder for astrakhan sheep; the summer vegetation consists of a perennial type of feather grass and dantonia adapted to growing on sand. The jangals grow in the lowest parts of northern and southern Tadzhikistan. Their total area is very small.

The shiblyak or, as it is often referred to, "thin xerophytic forests," is found on carbonaceous brown soil between the Kuraminskiy Range in the North and the low mountain plateaus of South Tadzhikistan. It forms a special forest belt at an altitude between 700 and 1,700 m (and up to 2,000 m), but in many places it has been almost completely destroyed; the remaining scattered pistachio and Bokhara almond trees are mute witnesses of a lush vegetation in the past. In addition to the mentioned species, the shiblyak includes also small-leaf maple, hackberry (iron tree) judas trees, sumac, unabi (or chilon), pomegranate, fig trees, "derzhi-derevo," etc. The largest pistachio forests remain in South Tadzhikistan, where they cover a total area of 208,000 ha. The grass cover of the shiblyak forests consists of a variety of annual and perennial vegetation. The uncontrolled grazing of sheep and goats has an adverse effect on the self-reproduction of the pistachio trees, which are the most valuable

among the nut trees. Pistachio trees are predominant in the South Tadzhik botanico-geographical area, while the sumac and chilon are conspicuous in the Gissar-Darvazskiy area. Natural concentrations of fig, pomegranate, and judas trees still remain in the southwestern part of the republic and at the western and southern slopes of the Darvazskiy Mountain Range. These warmest areas of Tadzhikistan are outstanding natural gardens of wild-growing subtropical plants.

The most common type of drought-resisting trees are the archevniks (savin trees). They consist of juniper trees which, together with the steppes, form vast vegetation belts; they account for about 50% of the forest area. They may be classified, on the one hand, as warm-weather low-mountain forests consisting of Zevershan savin trees, now mostly destroyed, and, on the other, as frost-resisting "uryuk" and "saur" savin trees, growing in separate or mixed forests at altitudes ranging from 2,000 to 3,000-3,500 m. The major concentration of these forests is found in North Tadzhikistan, particularly in the Turkestan Mountain Range, but they are found also in the Kuraminskiy (mostly "kara" savin trees), Zeravshan, and Gissar (on its northern slopes) mountain ranges. In South Tadzhikistan, the "kara" savin trees are followed by pistachios at a 1,600-1,700 m altitude; they grow also on the low mountain ranges of the South Tadzhik depression. In East Tadzhikistan the savin forests are less extensive and frequently consist of scattered trees extending eastward to West Pamir. Certain types of archevnik (savin trees) as the uryuk, for example, are found all the way to the alpine belt, where they form a stratified pillow structure on the surface up to 70-100 mm in height and manage to last several hundred years. The savin trees, which are valuable not only as high-caloric fuel but also as construction lumber, were cut down everywhere. That is why, in most cases, they now appear as thinly scattered forests. They have been preserved along the secluded canyons of the northern slopes of the Turkestan Mountain Range where they grow in dense forests 16-20 m high and 80-100 cm in diameter. The destruction of the savin trees made their natural self-reproduction almost impossible; growing in their place are less valuable herbaceous plants, and in some places soil erosion processes have been observed. The savin trees are excellent for holding the topsoil and for regulating the drainage, and the snow-thawing process. Their destruction impairs the water supply of the republic including the cotton-growing areas and facilitates the development of mud-and stone-carrying streams.

The mesophytic arboreal vegetation, despite its scarcity, is highly valuable economically. In the first place, it grows in the shape of broad-leaf, moisture-and-light-requiring forests in the central mountainous areas at altitudes of from 1,000-1,100 m to 1,800-2,500 m on brown soil,

forming a deciduous forest belt. It is more prevalent, however, in the Gissar-Darvazskiy area where precipitation is heavy. Dominating the lower part of that belt are greek walnut trees (chormaks in Tadzhik) which extend to an altitude of 1,800-2,000 m. The dense and thin forests of these trees cover the third largest area in the republic, after the pistachios and savins (about 29,000 ha.). The existing small nut groves or scattered trees are, as a rule, found along river banks and on northern slopes and represent the remnants of the vanished thick forests. But large and dense nut forests consisting of tall trees still exist in some places, as in the North of Muminabad, for example. The nut tree usually grows in close proximity to Turkestan maple, apple, and plum trees, and sometimes poplars, and is accompanied by various kinds of shrubbery, such as honeysuckle and igray, and occasionally also by Semenov spindle trees. The trees are frequently intertwined with wild grapevines. The vegetation cover of the nut forest ground is lush and highly variegated and contains many shade-enduring plants. Commonly occurring in the nut forest areas is the exochord, which often appears as a separate overgrowth, sticky-leaf ["vyazolistiy"] almond trees, etc., as well as scattered trees and groves of another remarkable plant, the chinar. In Tadzhikistan the nut tree is one of the most valuable plants, which yields well-known fruit and excellent lumber. Some of the wild-growing varieties of these nuts have a thin shell and contain up to 70%-76% oil, which is even higher than the oil content of the cultivated nut trees. Much work is now being done in the republic to expand the area of such nut trees. The annual nut crop amounts to about 100-200 tons but it could be considerably increased by a better organization of nut gathering and improved maintenance of the nut trees. Among the other components of the deciduous forests are maple, apple, ash, and elm trees, etc.

A conspicuous place in the general landscape is held by the tugays which consist chiefly of Turanag poplars, heterophylleus wild olive trees (jigda), and tamarisks which grow in the lower reaches of the Vakhsh, Kafirnigan, Kysylsu and Syr-Darya rivers. These trees usually grow in proximity to the overgrowths of original savannoid types of plants consisting of gigantic grass species, kamys or woolybeard grass, wild sugar cane from 2 to 5 m high, kiyak or imperat, licorice, etc. Most of the tugays have already been destroyed. But aside from its decorative uses, when grafted on cultivated olive trees, it could produce a valuable and tasty fruit and serve as a source of valuable resin for the textile industry. Growing primarily in the desert zone, the tugais serve as natural protective belts for the adjacent cotton fields.

Growing in small groves high in the mountains, in the savin belts, and along the upper borderline of the deciduous forests and brushwood, are moisture-requiring and frost-proof birch and poplar-willow-type trees

which are nourished by surfacing soil water and by the river valleys. Particularly large birch plantations are found in the eastern districts, such as those at the upper reaches of the Obikhingou River, along the Garmo River, and partly also in the river valleys of West Pamir where they are cut down and replaced by oblepikha overgrowths.

The predominant features of the Tadzhik landscape are determined not by arboreal but by herbaceous vegetation and undergrowth. The latter account for 50% to 60% of the entire area of the republic, not counting the "nival'niye" areas and the abandoned lands ["broscviye zemli"] covered with cliffs and numerous slides. The herbaceous vegetation and undergrowths form a natural fodder base for the animal husbandry industry. This fodder-type vegetation is favorable for grazing cattle since the duration of its growth varies with the altitudes and calendar periods.

Among the major drought-resisting pastures are deserts and steppes, while the secondary pastures consist of tragacanths and wild thyme fields. The deserts, consisting of low undergrowth of twisted wormwood and stalwort, are for the most part concentrated in North Tadzhikistan, where they cover vast areas between the Kuraminskiy range and the Syr-Darya River, partially extending to its left bank. Small concentrations of these deserts are found also in South Tadzhikistan. These low-altitude deserts, extending up to 800-1,000 m are used as winter and, to some extent, spring pastures. Highland deserts are found in some parts of Pamir, at altitudes ranging from 3,000-3,600 m to 4,000-4,200 m, where the annual precipitation does not exceed 60-100 mm. Their major types of vegetation are the semiundergrowth species of teresken, wormwood, pillow-shaped kurtkovnik, tanacetum, etc, which are used also as winter and spring fodder reserves. The vegetation in the deserts is extremely sparse, and the fodder yield correspondingly low -- from 0.5 to 2 centners per hectare.

The Tadzhik steppes are concentrated in the subalpine areas, at altitudes ranging from 2,800-3,000 m to 3,400-3,900 m, on the northern slopes of the Turkestan, Zeravshan, Gissar and Darvazskiy mountain ranges as well as on Petr Pervyy Range and to some extent in West Pamir. The turf grass cover of the steppes consists of fescue grass, meadow grass, koeleria, and different types of feather grass (particularly the feathery Kirgiz, Caucasian, and Turkestan types) and the Ol'ga white meadow grass with an admixture of Lemen wormwood. Some of the east Pamir steppes have a particularly desert-like appearance with their sparse grass cover and drought-resisting small wormwood varieties, -- both the eastern types and those growing on pebble soil. In West Pamir

and in some parts of the Darvazskiy and Petr Pervyy mountain ranges the steppes are "choked" with prickly grass varieties. The turf-grass steppes are the major and best highland pastures in the summer, but their fodder reserves are not great in view of the fact that the tragacanth (thistle grass) plants are not eaten by cattle. These pastures are used for 2-3 months.

Found in some places, especially in West Pamir-Alay, are steppes whose meadow-type or thistle vegetation cover consists of Turkestan adonis, catnip ["kotovnik"], oryzeae, tarragon feather grass, meadow grass, Zeravshan milkwort, etc. Though highly productive of fodder (up to 10-15 centners per hectare), these steppes, just like the subalpine heteroherbaceous steppes, contain an insignificant fodder reserve.

The tragacanth (thistle grass) consists of pillow-shaped esparsettes, tragacanth astragalus, kurtovnik (acanthaceae lemon), prickly Kuziniya, etc., which grow mostly in the subapline area of the western half of the republic. Just like the low-altitude thyme fields, they consist of high undergrowths (perovskiy, sage, and otostegiya), some of which contain volatile oils ["efironosy"] but are not valuable as fodder.

The most valuable pastures and hayfields are those covered with mesophytic vegetation -- grass-covered swamps, meadows and, to some extent, semisavannahs. Their development is determined by the high altitude and fairly heavy precipitation or by the near-surface soil water, and is restricted to the humid period of the year.

The semisavannahs (or subtropical steppes) cover not less than 10-15% of the republic's territory. Their vegetation is highly variegated, but dominated by perennial aster-bearing plants.

The low-grass semisavannahs are found primarily in South Tadzhikistan, in the light syerozem zone. These are the important major spring and winter pastures of the republic. Situated on ancient river terraces and hilly adyrs, they are covered with a variety of short-lived plants (annual brome grass, trischetinnik, goat's eye, barley grass, rogoglavik, etc.) with a predominance of short perennial sedge and bulbous or viviparous meadow grass, which begin to sprout in December or January, i.e., when precipitation begins. The short-lived vegetation grows very rapidly in March and early April. At that time the vegetation cover resembles the surface of a meadow and is characterized by thick and light-green growths; its colors ranging from yellow goose onion and white merendera to red tulip, poppy and remeriya or yellow crowfoot and violet malcolmium. The low-grass cover of the semisavannahs provides excellent fodder for all

types of cattle, particularly sheep and goats. With the onset of dry and hot weather, at the end of March or in the first half of April, the shortlived plants dry out and are replaced by scattered drought-resisting plants, such as annual stalworts or haloxylons (in rocky places; and wormwood, particularly in North Tadzhikistan). This desert-type vegetation, which in summer covers the same territory that produces mesophytic vegetation in spring, is used for winter grazing of sheep and goats.

The low-grass semisavannahs found at altitudes of 700-900 m in South Tadzhikistan and containing admixtures of large semiephemeroids, are followed by pistachio or shiblyak woods. In the western part of Pamir-Alay and on the northern slopes of the Turkestan Mountain Range, where such woods were destroyed, at altitudes ranging from 900-1,000 m to 1,800-2,000 m, have now been covered with couch grass, and the more humid areas with bulbous barley grass. The semi-savannahs, producing large crops of tall grass (from 30 to 60 centners per hectare), are generally used as winter or temporary pastures.

The tall-grass semi-savannahs consist of large umbrella-shaped yugans, camomile or ferule, giant elecampane, or anduz, etc, which grow in mountainous areas and frequently also at the juncture of broad-leaf forests and brushwood up to an altitude of 2,500-3,000 m (as on the southern slopes of the Gissar Range, for example). Beginning in April-May, their growth starts later with the rising altitude, and is completed in July-August, long before the onset of the cold weather. The tall-grass semisavannahs are classified as temporary summer pastures. The Yugan leaves skin-burning when fresh, make good fodder when mowed dry; that fodder is stored in large quantities for feeding cattle in wintertime.

The major mesophilous summer pastures are followed by wastelands and meadows. The cryophilous wastelands, often called Alpine meadows, are found almost exclusively in the Pamir upland areas at altitudes of 3,400-3,500 m and in its western areas at altitudes of 4,000-4,100 m. They usually appear in small scattered areas among rocks and rock waste (talluses). Small tracts of them are found also in the eastern districts and in Pamir. The wastelands /"pustoshi"/ resemble steppes rather than meadows, and, with the exception of the "spring" period (end of June and beginning of July), are not known for their bright colors. The vegetation there is well-adapted to the severe climate, particularly to low temperatures. This is manifested by the shortness of the grass cover, which frequently consists of turf grasses or soft and flat pillow-like undergrowth and a variety of other grasses. Typical of the turf-like wastelands also are various groups of kobreziya (Persian, Pamiro-Alay

dwarf types), rupture worts, short meadow grass, and oryzeae growing in undergrowth and semiscrub vegetation, including bulbous ostrolodka, astragalus, cinquefoil (snow fan-leaf types, etc), prolomniks, crowfoot (red cup, black cup, Alay and Turkestan types, etc), primrose, sibbaldiya, etc. The kobresiya wastelands, which are among the best highland pastures for both small and large livestock (yaks), are most widespread in Pamir where they cover vast areas but are seldom found in the western part of the republic. The latter territory is dominated by wastelands covered with ostrolodka and rupture wort. Small wastelands covered with large varieties of grass are found throughout the Tadzhik highlands, but mostly on the southern pebbly mountain slopes where the humidity is higher and the soil better. There the multicolored and bright grass cover is formed by svercia, Kashmir lagotis, beautiful white wind flowers, globe flowers, snow primrose, prolomnik, etc. On the southern pebbly slopes it is covered with scattered but tall overgrowths of Gissar buckwheat flour, Kara-Rau white meadow grass, beach grass, etc. Despite their low fodder yield, these wastelands are valuable as cattle-fattening pastures since their fodder is rich in carbohydrates and albumin. They are generally used in August and September.

The meadows of Tadzhikistan are mostly concentrated in the subalpine zone, above 2,500-3,000 m, but are on the whole of secondary importance. Only in rare cases are they extensive enough to form a separate land belt; among such extensive meadows are the characteristic subalpine meadows covered with various grasses and whose structure is somewhat similar to that of the steppes. Growing alongside the typical mesophilous plants, such as miscellaneous orchard grasses, Zeravshan foxtail grass, Turkestan and Angrenskiy brome grass, numerous types of regneria, Bokhara meadow grass, toron, Alpine buckwheat, Thomson ligularium and, in some places, Zeravshan milkwort, are certain elements of the tragacanth and steppe vegetation. Found occasionally along the upper borderline of the broad-leaf forests and brushwood are highly valuable meadows covered with Gissar vetch, Popov fenugreek, miscellaneous orchard grass, vetchling, and blue lucerne which alternate with clusters of beautiful endemic mul'mak-vetchling. Widespread also are intrazonal meadows resting on the moist soil of river and lake valleys (as in Iskanderkul', for example). The basic components of the tall grass cover of these meadows are a mixture of sedge and miscellaneous dicotyledonous grasses. In only a few places is the meadow vegetation used for hay.

Lying close to the meadows are bamboo marshes [*sazobolota*], which are found both along the foothills and on the uplands where the soil has a high moisture content, but they are not widespread. Among them are

the low-altitude grass swamps covered with high cane, reed grass, reed and sedge, etc., which are of little economic value, but are used for winter pasture (as for example, in the Syr-Darya River Valley, along the Vakhsh River, etc.), as well as high-altitude swamps. The latter are found at altitudes of between 3,000 and 4,000 m and higher and are favorite summer grazing land for all types of cattle. Their vegetation cover consists of miscellaneous cryophilous (frostproof) sedge (black, round, small, and malodorous), blissus, narrow-leaf kobreziya and other grasses (bristly foxtail grass, hair grass, Alpine timothy, etc). Many of the bamboo marshes are found in East Pamir where they are frequently accompanied by Alpine wasteland. The meadows and bamboo marshes form part of the summer pastureland which is used over a period of 3-4 months.

Despite the large variety of herbaceous vegetation and the valuable fodder it contains (especially in the low-altitude spring pastures and high-altitude summer pastures), the fodder crops vary a great deal from year to year; this and the relative meagerness of mesophilous plants and the abundance of inedible plants (as in the case of the subalpine meadows) does not always insure a stable green-fodder supply for the cattle. A rational system of cattle grazing, pasture control, a thorough and systematic utilization of pastureland, improvement and irrigation of desert land, planting of the best local types of grasses (already successfully begun by some kolkhozes and scientific institutions), the fight against weeds, and the implementation of timely hay-mowing all these are some of the measures required, but still inadequately carried out, in Tadzhikistan.

Vast stretches of the republic, not counting the snow banks and glaciers, lie at altitudes of 4,000-5,000 m, and sometimes lower, are covered with rock and rock waste, and are deprived of any vegetation. Located up there are a few types of the above-mentioned wasteland as well as certain cryophytes. These so-called preglacial plants are widespread in the area of permanent snow and glaciers. This is a high-altitude silent "desert." Its rocky surface is determined by the intensive physical disintegration process and downward slides of the displaced surface formations facilitated by the melting snow. It is very seldom that one can see some plants sheltered among the stones at altitudes up to 5,500 m. Further down, however, the cliffs are covered with a lower-type vegetation, mostly blue-green algae, which is highly viable under the intensive daytime solar irradiation during the short summer. Under these extreme conditions of life, the algae, heterotrophic fungi, actinomycetes and bacteria destroy the rocky soil and form a so-called primary fine-grain cover [*melkozem*], which in turn produces various types of moss and higher vegetation.

The Animal World

The main feature of the Tadzhik animal world is its extreme qualitative diversity. This is to some extent accounted for by the southern location and complex topography as well as by the fact that Tadzhikistan's fauna includes also specimens originating in several different zoogeographical territories. This country was reached by the following Indo-African and Indo-Malayan specimens: the porcupine, Venus' flytrap, the Indian starling, the Indian oriole, the cobra, the monitor (largest of the lizard family), Danayda and Khrisipp butterflies, arcilyasis sobria, and other insects. Other forms of life came from the Southeast: the Himalayan striped timelia, the Himalayan mountain bright tails ["gorikhvostka"], the savin oakmose (dubonos) and the Himalayan agama. Coming from the same direction were Tibetan forms of life: long-ear pischukha, mountain turkeys, sickle beaks ["serpoklyuv"] and the Tibetan sage grouse. Exotic for Tadzhikistan, these new forms lend a peculiar aspect to its fauna, which consists basically of animals from the North, the Aral-Caspian deserts and the Mediterranean.

We shall review the Tadzhik animal population according to the altitude belts, beginning with the lowlands, which cover a small part of the entire territory. Most of the agriculture is concentrated in the lowlands, and the animals living there are therefore worthy of special attention. It was not very long ago that herds of small antelopes (Dzheyrans) consisting of several dozen head each, were grazing on the plains in the Southwest of the republic. Large numbers of the ibex and Afghan wild sheep (urial) were roaming the low-altitude areas. Some Bokhara deer still remain in the tugais; they are now protected in the animal preserve called Tiger Valley, which derives its name from the Turan tiger, the largest wild beast of Tadzhikistan, still seen in some parts of the country. His kin, the leopard still inhabits the high deserts. The striped hyena and jackal are frequently seen in the lowlands. Another common inhabitant is the porcupine. Outstanding among the birds are those which have almost been exterminated in the cultivated zone: the Tadzhik pheasant, the decorative flamingo, the Indian oriole, the Indian or Afghan starling (maina) and the Indian swallow as well as the Venus' flytrap, which is found in the wooded mountain gorges. The desert abounds in a large variety of reptiles, including such poisonous snakes as the cobra, the sand efa, the armor-jaw and gyurza and the nonpoisonous racer snake and miniature steppe constrictor; the lizards are represented by agamas, gecko and monitors. There is also the tortoise. In addition to the above-mentioned exotic animals, there are many other, less interesting, inhabitants of the plains, such as the large groups of rodents combining Indian and Indo-African (nezokia and sand dwellers)

and Central Asiatic species (jerboas and house mice). The wild boars, already driven from the cultivated zone, used to be numerous here. Found in large numbers everywhere are the badger, the wolf, the fox, and the Tolai hare. These, incidentally, penetrate very high into the mountains. There are very many birds of a northern origin - from crows, sparrows, and small insectivora to wild water fowl. There is considerable animation as the birds fly past. Flocks of cranes, wild geese, ducks, woodcocks, and various small birds fly over the rivers, lakes, and deserts. Flying past also are bustards, which spend part of the winter there. Common among the fish in the relatively calm waters of the valleys are sheat-fish, flatnose (lopatonos), sazan, barbel, and zherekh. There are about 40 species of fish in Tadzhikistan, 46 types of reptiles over 350 varieties of birds, and more than 70 types of mammals inhabiting the plains and mountains.

The animal population of the mountains is essentially different from its lowland counterpart. There are few reptiles here, and their variety is limited; of the poisonous snakes, only the gyurza, and less frequently the armor-jaw, reach high elevations. The Indian and Indo-African forms of life are not common here; one of them, the Indian oriole, reaches highest into the mountains. The mountain fauna consists in the main of northern elements with an admixture of Himalayan and Tibetan elements. Of the hoofed animals, the Siberian capricorns are still the most numerous in the mountains. Living in the same area is the snow panther. The long-tail marmot and red "pishchukha" inhabit the same altitudes. Living in the same area, and even at higher altitudes, is the Himalayan "ular". The savin oaknose is common in the upper forest zone. The sickle beaks [*serpoklyuv"] are found along the river shallows. The area between these and the lower mountain belts is inhabited by the brown bear and, to a much lesser extent, the lynx. The ermine is found within a wide altitude range. The otter is also found at high altitudes, along quiet-flowing rivers. Martens may be seen occasionally. The forest dormouse and Turkestan rat, which occasionally infiltrate human habitation along with the house mouse, are typical nut-forest dwellers. Of the mouse-type rodents, the polevok and gray hamster rise high into the mountains. The game birds in the mountains consist of rare water fowl, ulars, quail, and mostly the Tien Shan keklik, which replaces the Kyzyl'kum keklik at higher altitudes; the latter is not found beyond the limits of the southwest lowland and low mountains. There is a numerous group of forest birds including reels, tomtits, thrush, hoopoe, and woodpeckers which live in the plains. The alpine jackdaw is strictly a high-mountain bird. Among the large birds of prey living in the mountains there is the golden eagle, the black "griffon", which lives on carrion, and ordinary and bearded vultures. They are found also in the plains. Trout and ("marinka") are caught in the rapid mountain streams and small rivers.

The unique fauna of East Pamir deserves special attention. The number of the species, limited by the severe climate, is not large. That is why there are whole groups of animals which are not found there, as for example reptiles and some of the birds requiring arboreal vegetation for nesting purposes. There are no Insectivora or mammals, and the number of rodents, especially small ones, is limited. Numerous among the larger animals are the Tolai hare and long-tail marmot. There is the Pamir pishchukha which is replaced by a different type in the western part of the republic. The arkhar is the only large mammal common in Pamir. Among the others are the Siberian capricorn [kozerog], snow panther, wolf, and fox. Bears are very rare. The typical birds there are: the horn lark, alpine jackdaw, vyurka, red duck, Himalayan ular, the Indian or mountain goose, which is not found in the other parts of the republic, the Tibetan ular, and the Tibetan sage grouse. On the whole, there are many more types of birds in Pamir, particularly those flying over it.

Some of Tadzhikistan's animals have a certain economic value. The tiger, snow panther, leopard, and ibex are usually caught for the zoos. The fur-bearing animal industry still is not well organized in Tadzhikistan, nor does one take advantage of the natural hunting seasons which are determined by weather conditions. The fur-bearing marmot, the most numerous type of all, is not used to the best economic advantage. The animal used mostly for commercial purposes is the fox and, to a considerable extent also, the marten; the furs of the reed cat [kamysheviy kot] and jackal are of poor quality. Wild-animal breeding is a promising industry. The first step in this direction was the successful experiment made by the zoologists in the acclimatization and restricted open-space breeding of nutria (of the otter family) in 1949-1953; the animals were then turned over to the Zagotzhivsyryo (Association for the Procurement of Furs and Peltry) which has been producing commercial fur since that time. Of the destructive mammals, we should mention the rodents, gophers, jackals, and wolves which, while destroying agricultural products and other animals, are also carriers of diseases affecting human beings and domestic animals. The most destructive of the birds are the sparrows -- Spanish and domestic -- which cause damages to the grain crops. The scare-crow method is the only one used against them, but that requires much labor and entails a corresponding loss of crops. Destructive also are the pine-finches which exterminate the bees, and the marsh harrier, which preys on the nests of the water fowl. Most of the birds, however, are useful in that they destroy harmful rodents, weeds, and particularly insects which thrive in hot climates. Useful also are the birds of prey which live on mice, cicadas, and locusts. The largest of

them, living on carrion, are useful from a sanitary point of view. Some birds and hoofed animals deserve the unstinted attention of the hunting community and the commission on wild life preservation, as this very valuable game is threatened by extermination at the hands of poachers.

There are several hundred types of vertebrate animals in Tadzhikistan, but the number of invertibrates runs into many thousands. We shall mention only some of the most important groups.

There is a large variety of worms in Tadzhikistan; as a rule, the most numerous of them are those capable of becoming parasites in human beings and agricultural animals.

Outstanding in the spider family is the scorpion, which lives in houses and other buildings as well as under stones and sometimes under the bark of trees. The poisonous karakurt as well as the tarantula are very common spider specimens. Common in the desert parts of the valleys and the central mountain belt are large spider-like Solpugida, or /"falangi"/ which are nonpoisonous but frequently frighten people who are unaware of that fact.

There are many dozens of tick species in Tadzhikistan. Many of these spider-shaped ticks are harmful to human beings, domestic animals, and plants and they are also disease carriers. Great damage to agriculture is caused by small spider-web ticks particularly by those living on fruit and berries. Responsible for serious damages to the cotton fields is the so-called cotton weevil which, incidentally, damages also all sorts of agricultural products including many types of trees and brushwood. About a dozen types of the ixodic and argasid ticks (of which there are 30 different kinds) are carriers of diseases dangerous to human beings (tick and relapsing typhoid and "KU" fever) and agricultural animals (Hemosporidia).

The number of insect species is larger than the combined total of animal and plant species: there are more than 10,000 of them. The common termite, which is wide-spread in the tropics, is also found in some Tadzhik valleys, but they cause no damage to buildings. Among the tropical insects are the palochnik, tree pilgram /"drevesniy bogomol"/, empuza, and certain crickets. Also the locust. Another serious agricultural pest is the Moroccan Mare locust.

Many types of Diptera are carriers of diseases dangerous to human beings and animals. The Anopheles mosquitoes, much more numerous here than in the central belt of the USSR, are known as carriers of the

malaria disease. The ordinary mosquitoes which, like the Anopheles type, abound in the desert areas of the republic and the mountains, are carriers of mosquito fever, or pappatachi, and the pendinskiy ulcer. Flies are carriers of various serious diseases everywhere. Thus the Tadzhik market fly is a carrier of infectious conjunctivitis. Certain types of flies (the Wolfart fly and others) produce serious infections in human beings and animals by depositing their larvae in the mucuous membrane of the nose, eyes, and ears or in open wounds; the larvae then pentrates deeper into the tissue.

There are about 200 types of aphids in Tadzhikistan; some of them (mostly the cotton, melon, and black lucerne aphids) cause great damages to the cotton fields. The fruits are seriously damaged by the blood and peach aphids. Belonging to the semicolepterous family or bugs (of which there are more than 700 types in Tadzhikistan), is the large black bug living in the northern areas of the republic (the Fedchenko type); its bite is unbearably painful.

The Hymenoptera comprise one of the largest families. The most numerous of them are the stinging and parasitic Hymenoptera which are confined to the high altitude areas. Among the larger stinging types is the eastern hornet, which is harmful to bee-keeping and viticulture, as well as the "scolium". Bumble bees are found only in the mountains. Certain parasitic Hymenoptera are highly instrumental in preventing the increase of such agricultural pests as the Turkestan brown-tail moth, the mountain ring bombyx, etc. Many agricultural products, trees, and shrub vegetation are seriously damaged by different types of beetles. The unirrigated crops in the valleys and foothills of Tadzhikistan are seriously damaged by the larvae of various cockchafers, particularly the humid-land [*bogarniy*] cockchafer. The city and village trees are adversely affected by the city long-horned beetle whose large larvae bore wide passages through tree stems.

There are at least 2,000 species of Lepidoptera, or butterflies, in Tadzhikistan. There are 600 of them in the comparatively small Vakhsh River Valley alone. The types found in the tugai forest include the large tropical ephemeral butterfly, damayda Khrizipp, and the gigantic Indian cutworm type, arcilyazis sobria (or the Kendyr brazhnik). Just like the vegetation of the valley tugais, the butterflies are unique and original [*samobytna*]. Unique also are the Lepidoptera of the sand desert, in the South of the Vakhsh Valley. Typical of the sandy areas is the shrub pest called calligonum [*dzhuzgun*], the calligonum bombyx, as well as the medium and small calligonum cutworms, the anthracite pigeon and a variety of snout moths. The Vakhsh Valley abounds in

cutworm and snout moth species. The butterfly varieties are considerably richer in the mountains than in the desert zone. Among them is the large fruit pest called peacock-eye Shenka. Among the ephemeral butterflies found in the higher altitudes are the beautiful apollons, swallow worts, some endemic types of Epinephelidae, erebium, and many cutworms and snout moths. The cotton cutworm and "keradrina" are very dangerous pests in the lower altitudes, and the apple-tree moth, the mountain ring bombyx, the Turkestan brown-tail moth and the Tadzhik hooded moth are mountain area pests. Over 150 types of lepidopterous tree and shrub pests are found in the Kondara River Gorge of the Gissar Mountain Range alone.

2. FROM THE HISTORY OF THE TADZHIK PEOPLE

The most ancient states of the Tadzhiks' ancestors (the Baktrians and Sogdians) who inhabited the Pamir, the Amu-Darya mountain districts of Tadzhikistan and the Zeravshan and Kashkadarya valleys were Baktria and Sogd. In the sixth to the fourth centuries BC, Baktria and Sogd had been part of the Akhemenide state created by the Persians.

The Baktraims and Sogdians were farmers, lived in oases, and engaged also in handicraft and trade. The predominant economic system was the ancestral village community with large patriarchal families, but slave ownership also existed. The working population suffered from arbitrary rule and the numerous taxes levied by the Akhemenides, which resulted in frequent uprisings in the country. Weakened by internal struggle and continued wars of conquest, the Akhemenide power fell under the pressure of Greco-Macedonian troops in 334-330 BC, though the Central Asian population continued their bitter resistance to the conquerors.

Approximately between 140 and 130 BC, the Greco-Macedonian power in Central Asia was completely overthrown by the population of the agricultural districts of Baktria and Sogd and the Massaget nomadic tribes. The Tokharistan state, formed in Baktria, as well as Sogd and other Central Asian areas, subsequently became part of the vast Kushan kingdom.

The geographic position of the new independent state, located between the Near East and China, was very favorable. The Chinese came there in search of allies against the Huns, and established trade and cultural relations with the Tokhars. Extending across Tokharistan were "silk routes" (several "silk routes" ran across Central Asia from South to North: the Pamir, Alay-Karateginsk, Fergana, and Semirechensk; the southern routes had been the busiest at an earlier time, and the northern later on); silk was bought in the markets of the Tarim River Valley

and taken to the countries of the Greco-Roman West. Tokharistan imported glass manufactures (thin multicolored glass and crystal glass) from Rome and the Byzantium; precious stones, decorative articles, etc from Central Asia, and spices, cotton, and woolen materials from India. Having their trading posts all along the route between Central Asia and China, the Sogdian merchants acted as the principal middlemen in the trade with China.

Slavery existed among the peoples of Central Asia along with the village community type of government. The Chinese found great economic and cultural achievements there, particularly the production of lucerne, grapes, cotton, and excellent horses, which had been unknown in China. Having learned the methods of producing lucerne, grapes, and cotton, they in turn contributed to the development of silk production and the gunsmith trade in Central Asia.

In the fifth century, Baktria, Sogd, and other areas of Central Asia were conquered by the Ephthalites, or white Huns, and in the sixth century by the Turks. The backward nomadic tribes came under the strong cultural influences of the Sogdians. The Turkic population settled on the land (mostly on the poorest parts of it) and inter-mixed with the local population.

That period was characterized by the deterioration of the slave system and the development of a new one -- the feudal system. Further advances in the economic and cultural life took place in the sixth and seventh centuries. New strides were made in the handicraft industry and trade. The production of better glass shifted to Central Asia from where it was copied by China. The production of minerals -- iron and copper, silver and gold, lazurite and ruby -- was begun in a number of places. The prefeudal cities with their handicraft industries underwent a change. Large-scale irrigation work was introduced, and the "Kyariz" type of irrigation (water brought in from outside) was practiced in arid places. Sogdian was the principal state and popular language which spread eastward to China. A rich literature was produced in that language, but it was later destroyed by the Arabs.

The development of feudal relations led to the formation of a large number of independent and semiindependent local principalities. Such a segmentation of the country made it difficult for the inhabitants of Central Asia to unify and repel the new foreign conquerors -- the Arabs.

The Arab conquest of Central Asia in the seventh and eighth centuries was a heavy blow to the high culture of Sogd, Tokharistan, and its other districts. The rich Sogdian and Baktrian culture was to a considerable

extent destroyed. The Sogdian literary language began to yield to Arabic. Islam became the predominant religion, replacing the former creeds and cults. The population had to pay a number of different taxes to the Arabs, and was subjected to forced labor in the construction of buildings, bridges, fortress walls, in digging canals, etc. The population of Tokharistan and Sogd were engaged in constant struggle, not only against Arab domination, but also against the local aristocracy. There were powerful and long-lasting uprisings, such as the peasant revolt headed by a tradesman Hashim ibn Hakim (Mukanna) which lasted many years (775-783) and threatened to deprive the Arabs of all their conquests in Central Asia. It took a great deal of effort on the part of the Arabs to suppress that revolt. Those uprisings served to show that the caliphate would be unable to keep Central Asia in subjection by armed force alone. This led the Arabs to include the local aristocracy in the administration of the country at about 750. But even that failed to strengthen the caliphate. On the contrary, the inclusion of the local aristocracy in the government and its growing role in the administration paved the way for the liberation of Central Asia from Arab domination.

It was under the local Samanid dynasty (874-999) that the actual liberation of Tadzhikistan and the whole of Central Asia took place. Taking advantage of the people's struggle for independence, the Samanids were the first, after the Arab conquest, to unify the disorganized country into a local state, almost independent of the Bagdad Caliphate. In the heyday of its development, that state extended from the Central Asian deserts to the Persian Gulf and from the Indian border to the Bagdad area.

The Samanids established a uniform system of state administration with a centralized state apparatus. For over 100 years that state was not subjected to foreign attacks, and that facilitated the development of agriculture, cities, handicraft, industry, and trade. The life of the city was no longer concentrated in the ruler's fortress but in the open trade and handicraft quarters. The production of textiles, pottery, and metals underwent further development as did, in some places, gun production. All the previously known mineral deposits were intensively exploited. Well developed also was not only foreign but also domestic trade, particularly with the steppe nomads. The circulation of trade and finance capital extended also to the feudal lords. The latter strove to lay their hands on as much of the irrigated land as possible, divide it into small plots, and rent it out. Made landless, the peasant became a share cropper.

It was during that period that the Tadzhik nation assumed its final form. Its spoken language became the state and scientific-literary language. The Samanid period was one of the most important periods in the

development of Tadzhik literature as that epoch produced a number of brilliant personalities. First among them were the brilliant founder of Tadzhik poetry, Rudaka, and the greatest poet of that period, Firdousi, the creator of the world-famous epic "shakhname".

The scientific achievements were no less great than those in artistic literature. There was a large number of scientists in every field of knowledge at that time. Among the outstanding ones was the world famous scientist-encyclopedist of the middle ages Abuali ibn-Sino (Avicenna).

The class antagonism, the struggle between the feudal lords, and the central government, the constant intrigues between the representatives of the court and the officials of various departments, and the friction between the rulers of Samanid origin and their military chieftains of Turkic origin combined to shake the Samanid state which, unable to withstand the pressure from outside, fell under the blows of the Karakhanides in 999, and the Gaznevides in the South (South of the Amu-Darya).

The unification of Khorasan, Tokharistan, Northern India, Iran, and part of what is modern Tadzhikistan around a single center again created certain prerequisites for the development of science and literature. Poets and scientists, including one of the greatest scientists of the middle age, the famous traveler Biruni, lived in the court of the Gaznevide Sultan Makhmud.

That period was marked by an intensive feudal decentralization of the land. The practice of extending land grants, or ikta, to distinguished military chieftains became widespread. The big hereditary landowners, the dekhkans, were replaced by a new social group, the iktador-landowners. The latter proceeded to raise the taxes and increase the demands on the peasants, which made the conditions of the agricultural population considerably more difficult.

That period was marked also by the mass settlement on the land by the Turks. They crowded the native population off the better land and soon thereafter Turkic-speaking nationalities predominated the plains; different Turkic-speaking nations were formed in different areas: Uzbeks between the Syr-Darya and Amu-Darya rivers, Turkmenians in the Transcaspian steppes, etc.

The creative works of such outstanding representatives of Tadzhik literature as Nosiri-Khisrou and Omar Khayyam were originated by the end of that period.

In 1220-1222 Central Asia was conquered by the Mongols, who brought grievous times to the Tadzhiks, Uzbeks, Turkmenians, and other nations inhabiting that country. A number of the cities were reduced to rubble by fires and looting, their population was exterminated, and agriculture reduced to a state of extreme decay.

The Mongolian conquest placed Central Asia in the possession of one of Genghis Khan's sons, Chagatai, who farmed out almost his entire appanage to a rich Moslem merchant, Mahmud Yalavach. The local aristocracy rapidly developed into a bulwark of the Mongolian conquerors. The Mongolian princes issued special documents or "paitzy" to the rich landowners and merchants empowering them to keep the population in a state of semivassalage. The "suyurgal", a different version of the above-mentioned "ikt," became the principal form of ownership in Central Asia.

The unbearable oppression by the Mongolian conquerors and local artistocracy gave rise to national uprisings. The greatest of these was the one led by a tradesman, Makhmud Tarabi, in Bekhara in 1238. That uprising was directed not only against Mongolian oppression, but also against the local feudal aristocracy.

The greatest Tadzhik poet of that period (eighth century) was Saadi Shirazi, whose works became an integral part of Persian literature.

The 1460s saw the emergence of the Barlasy, one of the Mongolian tribes in Central Asia which had been brought there by Timur. In 1370 he seized power in Mavarannakhr (interriver area) and, following 2 wars of conquest, created a huge power with Samarkand as its center. Resuming his military campaigns, which were to last 35 years, Timur strove to attain world domination. And while destroying other cultured countries, this invader tried to improve the Central Asiatic areas. He devoted much attention to the construction of palaces, mosques, and mausoleums. Under Timur Samarkand became one of the most beautiful cities of that time. The Central Asiatic agricultural oases, destroyed and neglected during the period of the Mongol conquests, were restored. Irrigation work was begun, as was the development of agriculture. But all the economic and political measures taken by Timur were designed primarily to boost the income of his treasury and to serve the interests of the aristocracy. The oppression of the masses continued as before.

The economic development and the growth of the cities had their effect also on the cultural life of the country. Great advances were made in astronomy, mathematics, history, literature, music, and in the art of miniature painting and calligraphy in Central Asia under Timur and his successors. Enjoying world fame at that time were the poets Kamol Khudzhandi and Abdurrakhmon Dzhami, the Uzbek genius Alisher Navoy, the astronomer Ulugbed, etc.

Interdynasty struggle and the interference of the steppe nomads began to shake the Timur empire. The international situation was also undergoing a change. Capitalist industry began to develop in Europe, sea lanes were opened all over the globe, and the major role in world trade gradually shifted to Western Europe.

At the beginning of the sixteenth century, a considerable part of Central Asia was again subjected to conquest, this time by the Uzbeks under Muhammad Sheybani-khan. Internecine feudal strife reached its culmination point in the Sheybani state, and the country broke up into separate, independent, and mutually hostile principalities: Bokhara, Khiva and, later, Kokand, as well as the smaller mountain-area possessions of Shakhrisyabz, Gissar, Badakhshan, etc.

Concentrating the land in their hands, the rulers of these principalities strove to copy the system, luxury, and regal splendor of the khan courts. To that end, they subjected the working people to inhuman exploitation and burdened them with various taxes and obligations.

By the end of the nineteenth century, the Tadzhik nation was disunited. The districts inhabited by Tadzhiks (as well as by other Central Asiatic nations) were divided among different khanates and states. The majority of the Central Asiatic Tadzhiks lived in the Bokhara and Kokand khanates (in the Fergana Valley and Zeravshan Oasis), in some cities of the Khiva khanate, in the semiindependent upland principalities of contemporary Tadzhikistan (Karategin, Darvaz, Vakhan, Shugnan, etc), and in the northern districts of contemporary Afghanistan and India, and in Khorasan.

Thus the period between the fifteenth and nineteenth centuries was characterized by intensified feudal decentralization and endless internecine wars (particularly after the seventeenth century) which ruined the settled population and led to the destruction of the material values created by the people and paved the way for economic stagnation.

Trade relations between the Russian state and the Central Asiatic khanates had been established back under Tsar Ivan IV. The commodity exchange volume was small, but the variety of goods fairly large. The trade continued later on, and by the end of the eighteenth century cotton fiber was for the first time included in the shipments of goods from Central Asia.

Bokhara and Kokand became vassals of Tsarist Russia in 1868 and Khiva in 1873. A governor-general with headquarters in Tashkent was appointed in 1867 to administer the Central Asiatic territories annexed to Russia. Tsarist troops helped the Emir of Bokhara to take over the independent principalities of eastern Bokhara.

The peoples of Central Asia, including the Tadzhiks, now found themselves under the dual oppression of Tsarism and their own feudal lords. From an objective point of view, however, the annexation of Central Asia

to Russia was of progressive importance. It put an end to the internecine feudal strife and constant wars which had been a heavy burden on the working people. The Tadzhiks, as well as the other peoples of Central Asia, were given an opportunity to join the advanced cultural and revolutionary struggle of the Russian people.

Following its annexation to Russia, Central Asia was drawn into the world commodity market. Russia used it as a raw material base for her industry, particularly as a source of cotton and Astrakhan fur, and as a market for her own goods, mostly textile manufactures. Capitalism began to sprout in Central Asia. Cotton-processing plants and oil mills were built, and oil and coal extraction was begun in the Khondzhent Okrug (northern Tadzhikistan). A class of local proletarians, though not numerous, began to emerge.

The construction of railroads in Central Asia began in 1870. The first railroad line extended eastward from Krasnovodsk; in 1897 it reached Andizhan and in 1899 it was extended to Tashkent; the Orenburg railroad line reached Tashkent in 1905. Navigation was begun on the Amu-Darya river.

To obtain better raw materials, commercial capital had to pay more attention to certain branches of agriculture. Higher-yielding cotton cultures (with an opening boll) and better potatoes and oats were introduced, and fruit orchards were improved.

But the Russian capitalists did not build a large industry there. Nor were their capitalist-type plantations successful. The labor of the landless share cropper was much cheaper than hired labor. The profits derived by the capitalists were so high that they did not find it necessary to spend money on irrigation improvements or machinery. They confined their activities to making downpayments and purchasing cotton and other raw materials; the local bourgeoisie usually acted as middleman between the colonizers and the cotton producers. The kishlak (central asiatic village) underwent an unprecedented process of economic polarization. Growing rich, at one end, was the bai who was buying up and, more frequently, taking away the land of the ruined farmers; coming to the foreground, at the other end, was a class of landless sharecroppers and farm hands working for the bai for a pittance.

Such was the case particularly in the Khodzhent district, which was part of the Turkestan governorship-general. Still more oppressive were the conditions of the people of the Bokhara khanate where the Emir held unlimited power in local affairs. Ruined by the war with Russia, reparations payments and incessant internal disorders, the working

population was also deprived of all civil rights. The khanates were divided into "beks" (oblasts) and cities, the "beks" into amlyaks (counties), the latter into "kents" (townships), and the townships into kishlaks (villages). Heading each administrative unit was an official who, though working for the emir, received no salary from the treasury but lived entirely on the requisitions taken from the population. Under the custom prevailing in the Bokhara khanate, the emir would distribute land, including kishlaks, among his favorite officials, and the people of those kishlaks would be obliged to work for the owners of such land as serfs. The Tadzhik working people were without exception illiterate, and the influence of the clergy on the masses was exceptionally great. The women had no rights at all. Slavery, though formally abolished under the agreement with Russia, actually continued to exist.

All the above-mentioned conditions were a great deal harder in eastern Bokhara (now South Tadzhikistan) which the Bokhara rulers considered as their colony. The steadily rising taxes and various demands on the population gave rise to frequent uprisings in which the Tadzhik took an active part along with the other peoples of Central Asia. In 1885 a Tadzhik revolt flared up in the Bol'duzhan "bed" under the leadership of a peasant named Voce. Another one broke out in the same place in 1886 and also in 1887-1888. An uprising took place in the Kelif "bed" in 1900, in the Denau "bed" in 1901, and in the Kurgan-Tubin "bed" in 1902.

But even in those hard times (the second half of the nineteenth century) there were progressive personalities among the Tadzhiks, as the educated and talented writer Akhmad Donish, for example. At the beginning of the twentieth century, the Russian revolution inspired the activities of a number of other leading writers of Central Asia, including the founder of Tadzhik soviet literature, Sadriddin Ayni.

The Russian revolution of 1905-1907 exerted a strong influence on the development of the revolutionary movement in Central Asia. In 1907-1914 there was an increase in the number of bolshevik organizations engaged in revolutionary work there.

The mobilization of the local population by the tsarist government for labor duty in the rear in connection with the prolonged imperialist war, culminated in an uprising almost throughout Central Asia in 1916. The Tadzhiks took an active part in that uprising in Khodzhent, Kostakoz, Ura-Tube, and Pendzhikent. It was primarily a spontaneous peasant uprising, poorly organized, and led by inexperienced people. The troops of the tsar and the emir succeeded in suppressing it. However, it served to revolutionize the masses and later played an important part in the national liberation movement.

The result of the overthrow of the autocracy in February 1917 was the establishment of soviets of workers' deputies in a number of Turkestan cities as well as in the city of New Bokhara (Kagan). The Turkestan governorship-general was abolished at the end of March 1917. But the February bourgeois-democratic revolution did not materially change the life of the Central Asiatic peoples. The former Turkestan governorship-general was replaced by a committee of the provisional government, which preserved the old colonial regime and did not even attempt to abolish national oppression. In Bokhara, the emir managed to maintain his despotic regime until 1920.

The victory of the armed uprising of the Russian proletariat in October 1917 triggered the struggle for soviet power also in Central Asia. In November 1917 the soviets emerged triumphant in Tashkent and later in almost all of Turkestan, including the northern districts of Tadzhikistan. The Turkestan Autonomous Soviet Socialist Republic was established in April 1918, as part of the RSFSR.

The government of the emir-dominated Bokhara adopted a hostile attitude toward Soviet Turkestan from the very first day of its existence. Supported by the feudal aristocracy, the Moslem clergy, and the local bourgeoisie, the emir began to prepare for a struggle against the Soviet Government. In his preparations he also leaned on the support of the basmatch bands, the Russian White Guards, and foreign imperialists. The emir's struggle against soviet Turkestan was further facilitated by the complicated and difficult conditions of the soviet government in Central Asia.

A general staff of the Turkestan front was organized in August 1919, under the command of M. V. Frunze for the purpose of smashing the counter-revolution as rapidly as possible.

Important political, cultural, and economic measures designed to strengthen the young republic were instituted at the same time. The first Central Asiatic State university was opened in Tashkent during the height of the struggle against the emir. It was at that time also that the Government of the RSFSR appropriated 50 million rubles for the restoration of the cotton irrigation system in Turkestan.

The major counterrevolutionary forces in Transcaspia and Semirechye were liquidated in 1920. But the civil war was not over, as basmatch bands, supported by the Emir of Bokhara, were still active in a number of Uzbek and Tadzhik districts, particularly in Fergana.

But the successes of the Soviet Government in the Turkestan ASSR and the activities of the underground organizations of the Bokhara Communist Party, established in the summer of 1918, revolutionized the workers of the Bokhara khanate. In a number of places (Chardzhou, Bokhara City) antiemir uprisings broke out by the end of August 1920. Acting on the request of the rebels, Red Army units of the Turkestan front came to their aid and, after a series of battles lasting 4 days, the city of Bokhara was captured by the rebels. The emir fled.

In September 1920, the first All-Bokharan national kurultay (congress) proclaimed the establishment of a Bokharan People's Soviet Republic and elected a government. The region was proclaimed not a socialist, but a people's soviet republic since its economic and political conditions were not yet ready for the establishment of socialist relations. This was accompanied by the institution of revolutionary measures in the interest of the broad masses of the working population. Freedom of speech, press, assembly, and trade unions was guaranteed to the citizens of the republic; the church was separated from the state; all the land was declared state property and used for allocating land parcels to the landless and land-poor dekhkans.

The strengthening and development of the Bokharan People's Soviet Republic took place against the background of a desperate class struggle. Dethroned by the revolution, the emir fled to Dushambe and there, supported by the bais, clergy, and other counterrevolutionary elements, organized an army of several thousand and launched an offensive. The government of the Bokharan People's Soviet Republic, too weak to defeat the forces of the counterrevolution, appealed to the RSFSR for help. Acting on orders from the latter, the Turkestan front command dispatched the Gissar Expeditionary Detachment, which engaged the emir bands in battle in February 1921. Overcoming enormous difficulties, the detachment routed the emir's troops and captured Dushambe, Kulyab, and Garm in February and March of 1921. But as soon as the major units of the Gissar Expedition left eastern Bokhara, large basmatch bands began to commit outrages in the Bol'duzhan, Karategin, and Darvaz districts. Small Red Army units, after repulsing numerous basmatch attacks and suffering from a shortage of ammunition and food, were compelled to withdraw to Dushambe and later to the Termez-Shirabad-Baysun line. A considerable portion of eastern Bokhara fell into the hands of the basmatchs under the command of Enver-pasha. Enver proceeded to restore the prerevolutionary order, ruining and exterminating the working dekhkan people in the process. The existence of the basmatchs in eastern Bokhara made it impossible to establish a soviet government through elections. The provisional soviet government in eastern Bokhara was an extraordinary

dictatorial commission of the All-Bokhara Central Executive Committee, with its local revolutionary committees, for the affairs of eastern Bokhara. The infiltration of hostile elements in the Bokharan People's Soviet Republic and the Bokharan Communist Party made the struggle against the avowedly counterrevolutionary forces more difficult. A purge of the Bokharan people's government was carried out in May 1922. A specially organized group of Bokharan troops went into action against Enver, which resulted in the rout of his bands in the summer of 1922. Enver himself was killed. The other large bandit units were smashed by the middle of 1923 and a crucial blow was thus dealt to the basmatch movement.

Organizing the struggle against the basmatchs, the party and government also made a major effort to restore the national economy and enlist the large-scale participation of the broad masses of dekhkans in the building of socialism. Measures were also introduced which were designed to improve the material welfare of the working people of the Bokharan People's Soviet Republic. Those measures included the exemption of the dekhkans from agricultural taxes, the extension of credits to farms ruined by the war, increased imports of industrial goods, etc. In 1924 the Soviet Government allocated over 20 thousand poods of seeds for use by the poor farmers. The construction of a network of schools, various courses, and other educational and cultural institutions got under way.

In 1925 the state of emergency was discontinued and the Bokharan People's Soviet Republic transformed into a socialist republic. A decision was adopted to divide Central Asia on a national-territorial basis, and the result was the formation of the Uzbek and Turkmenian Soviet Socialist Republics and Tadzhik ASSR as part of Uzbekistan.

The most important political and economic measure implemented in the northern part of the republic was the land-and-water reform under which the working dekhakans received land and water while the exploiting bais and usurers were deprived of all privileges. This was accompanied by the liquidation of the remnants of the old emir government apparatus (the amlakdar, or tax-collection, institute, and trial by officials) and a declaration was adopted on the emancipation of women, the introduction of the universal education of workers, etc. The large-scale economic and political effort initiated in the republic led to steadily growing political activity and awareness on the part of the working dekhkans and to the emergence of national cadres.

The successes achieved by the Tadzhik people in the field of socialist construction created the necessary prerequisites for transforming the Tadzhik ASSR into a Tadzhik Soviet Socialist Republic in 1929. The republic included Khodzhent Okrug, formerly part of the Uzbek SSR, but not within the Tadzhik ASSR. The capital of the republic, Dushambe, was renamed Stalinabad.

Under the five-year plans, Tadzhikistan has grown into a prosperous socialist republic with a high culture and well-developed economy. The achievements of the Tadzhik SSR in the development of its economy and culture are discussed in the subsequent chapters of the book.

3. POPULATION AND CULTURE

According to the 1939 census, the population of Tadzhik SSR amounted to 1,484,400 people. Its present population is 1.8 million (according to the 1956 estimate). The average population density is 12.7 persons per square kilometer which is higher than in Kirgizia (9.5) and Turkmenia (2.9), but lower than in Uzbekistan (18).

A mountainous country with an intersected topography and large areas unsuitable for human life and economic development, Tadzhikistan is characterized by a very uneven distribution of the population. The bulk of the population is concentrated in the warm valleys: in the western part of the Fergana Valley, in the Gissar, Vakhsh, and Kafirnigan valleys as well as those of southeast Tadzhikistan. The average population density in the majority of the valleys is 30-60 persons per square kilometer, and in some districts the figure goes up to 100 and more. In the mountain districts the population is found along the narrow valleys, while the watershed areas are practically uninhabited; their population density is therefore considerably smaller. The population density of most of the central Tadzhik districts, where the topography is predominantly of the medium highland type, is 10-30 persons per square kilometer, and in the western Pamir highlands only 2/3 persons. The population of the severe upland of eastern Pamir is still sparser, 0.2 persons per square mile, despite its relatively level surface.

Between 1926 and 1939, the population of the republic increased by another 50%. But its growth was very uneven in different areas. There was a more rapid increase in the population of the valleys where agriculture and industry are highly developed. The basic and most profitable branch of agriculture there is cotton growing, which attracted large numbers of new settlers from the mountains. In a number of administrative districts, as in the Vakhsh valley for example, there was a 2-3

fold and even 10-fold increase in the population during that period. Some of the districts, on the other hand, were settled for the first time. In the mountainous parts of the republic, where agriculture consists mainly of grain-farming and cattle-raising, the population growth was slower than in the cotton-growing areas, whereas the population of the central and northern districts of southeast Tadzhikistan actually decreased in view of the exodus toward the lower areas.

A considerable part of the population has been moving to the cities, whose growth is accelerated not only by the local population, but by also by people coming to Tadzhikistan from various parts of the Soviet Union. The city population grows at a faster rate than the population as a whole. Two hundred and fifty thousand people were living in cities in 1939, which at that time amounted to almost 17% of the republic's population. One third of Tadzhikistan's present population is now living in cities and workers' settlements. The old cities, like Leninabad, Ura-Tube, Kanibadam, Kulyab, and Pendzhikent, were greatly expanded under the soviet government, and many new ones came into being. There are more than 40 cities and city-type settlements in the republic at present. One of the new cities, Stalinabad, has a population of 191,000.

The growth of the cities is indicative of the rapid development of industry and the increasing working class and intelligentsia. The number of workers employed in the heavy industry alone has increased several dozen times during the five-year plans. About 1/3 of the industrial cadres is made up of local national workers, including women.

The Tadzhiks, the indigenous inhabitants of the country speaking modern Tadzhik, constitute an absolute majority of the republic's population. A few small groups of Tadzhiks living in heretofore inaccessible mountain valleys have partly retained their ancient languages and dialects. Among them are the Pamir Tadzhiks -- Vakhantsy, Ishkashimtsy, Shugnano-Rushantsy, and Yazgulemtsy -- whose language is said to stem from the Saxon language, as well as the Yagnobtsy who live in the Yagnob River Valley (between the Gissar and Zeravshan mountain ranges); the latter retained the dialects of the Sogdian language spoken by some of the modern Tadzhiks' ancestors prior to the conquest of Central Asia by the Arabs, i.e., before the eighth to the tenth centuries.

The Tadzhiks live everywhere in the country but they are in the absolute majority mostly in the mountainous areas of the republic. The reason for that is that during the period of political adversity and the conquest of the country by the Turko-Mongol nomads the native population was driven into the mountains by the newcomers where they were forced to live under severe natural conditions. The Tadzhiks are also in the majority in all the cities of the republic.

Under the Soviet Government, the settling of the Tadzhiks underwent considerable changes. Thousands of new settlers, mostly from the mountain districts, but also from the densely populated oases of the plains, came to the southern valley districts where virgin and formerly irrigated but abandoned lands are now under exploitation and new irrigation facilities under construction. Most of these settlers are mountain Tadzhiks now returning to the land once inhabited by their ancestors.

There are 2 types of settlement land in Tadzhikistan: the plains and the mountains. Predominant in the densely populated valleys is the oasis-type large settlement (kishlak), usually extending along a small river or large aryk (irrigation ditch). Some of the largest of those kishlaks numbered several thousand inhabitants in 1939, such as the following in Leninabad oblast: Kostakoz 10,953 people, Ispisar 8,420, Nau 6,947, Chorku 6,364, Undzhi 6,100, Vorukh 5,401, etc. (Some of those large settlements have now become cities or city-type settlements; for example Chkalovabad (formerly Kostakoz) and Sovetabad (formerly Ispisar). Large kishlaks, though smaller in size and fewer in number than in the north, may be seen also in the Gissar, Bakhsh, and other valleys of southern Tadzhikistan. The kishlaks are surrounded by large tracts of cultivated fields and orchards.

A different type of kishlak is found in the narrow mountain valleys. There is little land suitable for cultivation there, and the scattered plots of land are often very far from the settlement and from each other. The mountain kishlaks are usually small: 10 to 15 households. The houses are frequently built on steep mountain slopes, almost on top of each other, so that the roof of each house, barn, or storage building is used as a platform by the house above it. When there is no house below to be used for such purpose, the flat ground in front of it is made into an artificial terrace of stone and earth. An exception in this respect are the larger kishlaks, consisting of 100 households and more, usually found on the large alluvial fans in the mountains or on the river terraces of the large valleys. Such are some of the kishlaks of the Obikhingou and Surkhob River Valleys in Central Tadzhikistan, in the Yakhsu River Valley, and in other places.

Before the revolution the Tadzhiks' houses were the same as those of other settled nations of Central Asia, with some differences between the valley and mountain houses. Most of the houses in the northern part of the republic were frame houses reinforced with dry clay or raw brick, and in the south the adobe-type house predominated. The mountain kishlak inhabitants built their thick house walls with large chunks of shapeless rock mortared with clay. The roofs of their houses as a rule consisted of beams covered with many boards and poles which, in turn, were covered

with layers of earth of varying thicknesses depending on the amount of precipitation. Gable reed roofs were built in some parts of the southern districts. The type of heating used before the revolution in southern Tadzhikistan and in almost all the mountain districts was "chimneyless heating" [Kurnoye otopleniye], the heating system used in northern Tadzhikistan was primitive fireplace or "sandal" (a large stool -shaped object covered with a blanket; the people sat around the stool under the edges of the blanket warming themselves in the heat produced by the live coals placed in a hole under the stool).

The planning and construction of kishlaks have undergone great changes under the Soviet Government. They are particularly conspicuous in the new kishlaks with their straight broad streets lined with trees. Sovkhoz, MTS, and frequently also kolkhoz centers are acquiring the features of city-type settlements consisting of houses with glass windows, schools, power plants, shops, medical stations, etc. In the old kishlaks themselves, even in the most isolated ones, windows are being built in the walls, the chimneyless heating system is replaced by stoves, and furniture and other factory-made household goods are making their appearance in the houses.

As in the past, the bulk of the Tadzhik population is engaged in agriculture: land cultivation and animal husbandry. The Tadzhiks have been farmers since ancient times. The traces of large irrigation structures and kyariz (underground canals for bringing the subsoil water to the surfaces) as well as suspended ["visyachiye"] mountain canals dug on almost vertical canyon walls attest to the high agricultural level of their ancestors. It is not accidental that the modern Tadzhiks are the best irrigation experts in Central Asia.

All sorts of handicraft trades and small industries have been widespread among the Tadzhiks since the remote past. The beautiful carved-wood monuments of the tenth to the twelfth centuries, remnants of highly artistic patterns on cloth found in the excavations of the Mug Castle, the last stronghold of Tadzhik resistance to the invading Arabs in the Zeravshan Valley, numerous finds of ornamented ceramics of different eras, remarkable paintings of ancient Pendzhikent, etc., still attest to this. The cities had their special quarters of weavers, ceramic workers, coppersmiths, blacksmiths, wood carvers, etc. Handicraft trades were widespread also in the rural community. The Tadzhik women used primitive stationary looms to weave napless woolen and cotton cloths with or without patterns. The men worked on foot-operated looms, some of them quite complicated, with 4-8 pedals, producing cotton, wool and silk for clothes. Earthenware was made everywhere. In the villages, the Tadzhik women, working without the benefit of a compass, produced a large variety of

clay pottery by hand with highly symmetrical ornaments on them. The ancient trades, particularly the artistic trades, are now being revived despite the abundance of industrial goods. Artels for the production of rugs, patterned materials, felting, and other articles have been organized. Old monuments are being skillfully restored and new structures decorated by famous Tadzhik artists.

The next largest population group are the Uzbeks, who live mostly in the broad lower valleys of the North and South of the republic. Some of them live also in the cities. Before the revolution, the South Tadzhik Uzbeks led a seminomadic type of life. They were made up of numerous tribes which differed from one another not only in name, but also in certain linguistic and ethnographic characteristics. Some of those tribes (Karluk, Turk, and others) had apparently come there in ancient times, while others (Lokay, Katagan, Durmen, etc) have lived there since the sixteenth century.

In the past, the major occupation of the Uzbeks living in South Tadzhikistan was animal husbandry and unirrigated [*bogarnoye*] agriculture. The Uzbeks raised a Gissar breed of sheep, Lokay goats and horses, and small herds of cattle to be used as draft animals in agriculture. The Uzbed women were famous for their production of felting, beautiful striped and patterned cloths, sacks and khurdzhums (bags made of netting). Survivals of patriarchal social relations, supported in the interests of the exploiting tribal rulers, prevailed in the social life of the Uzbeks until recent times. These same Uzbeks are now living in kolkhoz settlements and engaging in agriculture (cotton growing) and animal husbandry.

The Uzbeks living in Northern Tadzhikistan have not been much different from the Tadzhiks of the plains, in point of culture and occupation, either before the revolution or at present. Some of them moved to South Tadzhikistan under the Soviet Government.

Also living in Tadzhikistan are some Kirgizians, Kazakhs, Arabs, Turkmenians, gypsies, and other nationalities.

The Kirgizians inhabit the Dzhirgatal'skiy Rayon and eastern Pamir (Murgab district of the Mountain-Badakhshan Autonomous Okrug). As in the past, the Kirgizians engage in pasturable animal husbandry raising mostly fat-tailed sheep and yaks. The Kirgizians from the Dzhirgatal'skiy Rayon have engaged in agricultural work, and animal industry since ancient times. In the past they used to roam for pastures with their cattle, spending their summers in thick-felt yurtas; in wintertime they would move into large houses protected from the cold by flat earthen

roofs. At present the Kirgiz people are settled on the land, and only a small part of the population (the shepherds) follow the collective farm cattle to the summer and winter pastures. Felt making, carpet weaving, and knitting woolen stockings in various patterns are popular occupations among the Kirgizians.

Living primarily in the cities, workers' settlements, and MTS, and partly also in collective and state farms, is a large number of Russians and Ukrainians. Almost all of them settled in the republic under the Soviet Government, with the exception of some who had lived in the northern districts before. It should be pointed out that the Russians, Ukrainians, and other nationalities who moved to Tadzhikistan from the central areas of the Soviet Union have played an exceptionally important part in enhancing the culture and expanding the economy of the republic.

Great are the achievements of the Tadzhik peoples in the development of their culture, which is national in form and socialist in content. This can be seen in every field of culture and particularly in public education.

Universal compulsory education, including seven-year schools in the villages and 10-year schools in the cities, was introduced under the Soviet Government. There are about 2,600 public schools in the country, attended by approximately 340,000 children -- roughly 1/5 of the population.

A native intelligentsia -- specialists in every field of the national economy, science, and culture -- is rapidly coming to the fore in the republic. There are dozens of institutions of higher learning: the State Medical Institute imeni Abuali ibn-Sino, the agricultural and pedagogical institutes, etc. The Tadzhik State University with 5 faculties was opened in the capital of the republic in 1948. These schools are concentrated in Stalinabad, Leninabad, and Kulyab. Specialists of average qualification are trained in more than 30 special schools, technicums, and general schools in various cities and settlements of the republic. The number of college students, special and middle-school students, including correspondence-course students, is about 28,000.

Scientific-research work was begun in the republic in the very first years of its existence. That work has been developing under the following scientific institutions: the Committee for Tadzhik Studies - 1930, the Tadzhik Base of the Academy of Sciences USSR - 1932, the Tadzhik Base of the Academy of Sciences USSR - 1941, and finally, the Academy of Sciences Tadzhik SSR - 1951. The latter comprises 24 scientific-research institutions, including 8 institutes which are engaged in the study of the natural resources and the history of the Tadzhik people and the most important

problems relating to the development of the economy and culture of the republic. The academy has a staff of over 700 workers including 120 Phd's and masters of science. Also in operation in the republic are nonacademic scientific centers engaged in the study of agriculture, industry, public health, and public education. Working under the Ministry of Agriculture are scientific-research institutes of animal husbandry, agriculture, and subtropical fruit and vegetables, with numerous scientific-experimental bases.

Tadzhik literature and art have risen to a high level within a short period of time.

Tadzhik literature, especially poetry, has a history that is more than a thousand years old. But it is only now that all the people, not only certain individuals, are able to read the works of such outstanding writers and thinkers as Rudaki, Firdousi, Nosiri-Khisrou, Saadi, Khafiz, Dzhami, Kamol Khundzhandi, etc. The development of modern Tadzhik literature is facilitated by the poetic traditions of the great classics and the direct influence of the leading Russian writers. The remarkable books by the founders of Soviet Tadzhik literature, Sadriddin Ayni and the poet Abulkosim Lakhuti, enjoy wide popularity. Accessible to the average reader now are the works of Soviet writers of the younger generation: M. Tursunzade, M. Mirshakar, S. Ulugzade, J. Ikrami, B. Rakhimzade, R. Dzhalil, and many others. Suffice it to say that more than 50 new works by Tadzhik writers will be submitted for discussion during the Ten Days of Tadzhik Literature and Art to be observed in Moscow in April 1957.

Theatre shows, songs, dances, and national instrument playing performed by itinerant artists or ordinary amateurs have always been popular among the people. But the greater theatrical art -- national opera, ballet, the drama, and the comedy -- were not developed until our time. The peoples of Tadzhikistan have now joined the world culture: they now see plays by Shakespeare, Ostrovskiy, and Gorkiy, and listen to music by Tchaikovskiy, Glinka, Borodin, Verdi, and Bizet in their own theatres. There are 7 large dramatic and musical theatres in the republic, including the Academic Theatre of Drama and the theatre of opera and ballet as well as the State Philharmonic, which includes about 800 creative workers.

There are about 830 libraries in Tadzhikistan with a total stock of 3.5 million books and magazines, and over 1,050 houses of culture and clubs.

Cinemas and radios can now be found in the remotest districts of the republic. Three hundred and twenty motion-picture installations are in operation. There is also a national motion picture studio of art and news films. Paintings, drawings, sculpture, and the new architectural installations show a further development of the fine arts.

The new socialist culture is becoming integrated in the daily life of the people and in their mutual relations. People of various nationalities live and work together as friendly families in kolkhozes, workers' settlements, and cities. There is a constant cultural exchange among them; this is in part facilitated also by intermarriages, which were almost impossible in the past.

Although the influence of Russian culture on the Tadzhik peoples is very strong -- the European clothes worn by the city people, the construction of European-type homes in the villages, the appearance of factory-made furniture, utensils, radio sets, etc in the homes of collective farmers -- the original features of the culture these peoples have not only been retained, but are being further developed.

Tadzhikistan is equally concerned about the cultural development of the Tadzhiks and the citizens of the other nationalities. The children are taught in their native tongue. Many middle schools and colleges have their Tadzhik, Russian, and Uzbek groups. The republic's newspapers and magazines are published in the Tadzhik, Russian and Uzbek languages. The Tadzhik state publishing house publishes political, artistic, and popular science literature and textbooks in Tadzhik, Russian, and Uzbek.

The formation of a native working class, collective-farm peasantry and new intelligentsia, the development of national culture in the best traditions, and the creative friendship with the Russian and other peoples of the USSR -- such are the basic results of the social and cultural transformation of the Tadzhiks who are consolidated into a united socialist nation.

4. ECONOMY

The restoration and development of the national economy of Tadzhikistan under the Soviet government was begun 6-8 years later than in the other areas of Central Asia and carried out under very difficult conditions. The destruction left in the wake of the Civil War was particularly great. (The deterioration of the economy in Tadzhikistan, not including the Khodzhent Okrug, may be characterized by the following figures: compared to 1914, the gross production of the national economy in 1924 was

44%, the irrigated area under crops 21%, and the area planted to cotton 5%). Even before the struggle against the counterrevolutionary forces was over, the Communist Party and the Soviet Government undertook the job of restoring and developing the national economy of the former peripheries of Russia in accordance with the Leninist principles of a nationality policy which called for the full political, cultural, and economic equality of all the peoples of the Soviet Union. Inasmuch as the former peripheries of Russia had been far behind the central areas in economic and cultural development, they required effective and prolonged assistance. The Government of the USSR did everything it could for the young republic: it appropriated large sums of money and sent machinery, specialists, and workers who shared their scientific and production experience with the local workers. Until 1936 the expenditures of the Tadzhik budget was made up largely of subsidies granted by the government of the union. (In some years these subsidies accounted for 90% of the budgetary expenditures of the Tadzhik SSR). Since the rate of development of the national peripheries was still very low in comparison with the central areas, the Communist Party and the government provided for a more rapid tempo of economic and cultural development in the First Five-Year Plan. The needs and requirements of these areas were equated with those of the entire Soviet Union. Large capital investments were made in the national economy of the republic; the latter were designed to facilitate its planned and all-round development. During the first Five-Year Plan and the years preceding it, most of the funds were invested in agriculture, particularly in the restoration and further development of irrigation. The various branches of agriculture in prerevolutionary Tadzhikistan had not been in keeping with the natural possibilities of the country. Grain cultures had been raised even on irrigated land. The cotton-growing area had been comparatively small and concentrated primarily in the North. A similar situation prevailed also in the case of the other branches of agriculture -- orchards, viticulture, and silk production -- which had been developed in isolated districts. Under the Soviet Government, widespread changes were made in the structure, quality, and distribution of agricultural branches. Cotton became the basic crop of the irrigated land in the lower valleys. Grain sowing was shifted to the mountainous areas where no irrigation was required. Most of the cotton is now raised in southern Tadzhikistan where there was practically no cotton planted before. This part of the republic is now among the leading producers of thin-fiber cotton in the Soviet Union. The Tadzhik SSR produces about 40% of the cotton in the Soviet Union). Quantitative and qualitative changes were made also in animal husbandry. Astrakhan sheep raising became widespread in the southern valleys. A new breed of highly productive goats was developed. The breed of local sheep, cattle, and horses is being improved.

The development of the economy of the backward peripheries included also the development of their electric power, industry, transportation, and mining.

Much attention was paid to the development of the republic's industry. The foundation for an industry was laid during the first 3 Five-Year Plans (1928-1940). The rate of development of Tadzhik industry in those years was very high. (Compared with 1913, the total industrial output in 1955 was increased 38 times in Kirgizia, 17 times in Turkmenia, 14 times in Uzbekistan, and 24 times in Tadzhikistan.

About 30 different branches of industry were built in Tadzhikistan. Important from an all-union point of view are the cotton-processing, silk and cotton producing, and mining industries; the clothing, flour-milling, bread-baking, fuel-producing, metal-processing, building material industries, etc are now largely capable of meeting the demands of the republic. Thus the Tadzhik SSR is developing mostly the industries for which there is an adequate supply of local raw materials. Supplying the other areas of the Soviet Union with cotton, cloth, canned goods, wine, and ore concentrates, Tadzhikistan in turn gets fuel, fertilizer, manufactured metal, lumber, machinery, and other industrial and agricultural commodities.

The following Tadzhik industries will receive close attention under the Sixth Five Year Plan; expansion of the irrigated areas -- particularly those to be planted to cotton -- and improvement of the cotton yield; expansion of the fodder base and the animal husbandry and the development of the power and other industries, particularly the light and food industries.

Special attention is being focused on the major agricultural crop: cotton. The production of cotton in 1960 will amount to 700,000 t.

New irrigation ditches are being dug and dams built in various parts of the republic, and the largest water reservoir in Central Asia, the Kayra-Kum, is under construction.

Under consideration also is the expansion of the other branches of agriculture, particularly animal husbandry. The favorable natural conditions will be utilized for the development of fine-wool and semifine-wool sheep as well as the fodder sources. One of the measures designed to secure sufficient fodder for the domestic animals will be the irrigation of over 2 million hectares of pastureland during the five-year plan.

Expanding rapidly is the power industry. Large hydroelectric power plants will be built on the Amu-Darya River, on the Vakhsh Canal, and the Vakhsh River. A larger thermoelectric power plant will be commissioned in Stalinabad.

The output of the industry will be increased 1.4 times and even more in some of the branches of the industry. The production of electric power, for example, will be increased 4-fold, and cement 13-fold. The light and food industries will be reinforced by a few powerful enterprises. The textile combine under construction in Stalinabad, for example, will produce over 30 million meters of cloth annually, and the oil-and-fats combine will process over 130 million tons of seeds, i.e., approximately as much as is now being processed by all the oil mills of the republic.

The problem that needs solving in Tadzhikistan as in the other republics of the Soviet Union, involves the creation of an abundance of goods for the population and raw materials for the industry.

Agriculture

Before the revolution, the northern and southern parts of Tadzhikistan, though differing from each other in their economic development, were backward and primarily agrarian areas. Their socioeconomic inequality was very great, especially in eastern Bokhara where over 90% of all the irrigated lands belonged to the treasury, the church, and the emir (55.8% of the eastern Bokhara lands belonged to the treasury, 24.2% to the church, and 12.1% to the emir). Only a small portion of the land was privately owned, mostly by the bais and the emir's officials. The overwhelming majority of the dekhkans owned tiny plots of land and were compelled to work on government, church, and bai land for a small share of the crop. Many dekhkans were deprived of their personal land to cover their indebtedness, as a result, they became farm hands.

But Tadzhikistan has been an agricultural country since ancient times. Despite all the difficulties and adversities, the Tadzhiks developed many remarkable types of plants and breeds of animals adaptable to the natural conditions of this mountainous country. Suffice it to name some of the rare types of apricots and grapes, the Gissar sheep, the largest in the world, and the very light mountain horse. The farmer developed a high skill in the cultivation of the small plots of land and the construction of irrigation ditches in the high-mountain areas. But his labor was indentured and his agricultural implements and his irrigation and animal-raising methods remained primitive and substantially unchanged since the

hoary past. Ploughing was done with a wooden plough, harrowing with a bundle of dry branches attached to a log of wood, grain gathering with a toothless sickle, grain threshing by the hoofs of animals walking over it, and all the earth and construction work was done with a hoe.

The Great October Socialist Revolution changed the political and socioeconomic situation in the country. The land-and-water reform introduced in 1924 made the dekhkans the complete masters of their land and water resources. But agriculture was still technically backward. It took an enormous effort to reconstruct agriculture on a socialist basis.

Two hundred thousand tiny individual farms were merged into 3,000 collective farms between 1920 and 1937. The heavy industry built by that time in the Soviet Union provided a variety of machinery for Tadzhikistan's agriculture. The MTS and the state farms became the vehicles of technology and organizers of socialist agricultural production. (There are 71 MTS in the Tadzhik SSR). The major work processes in the field have been mechanized. In 1950 the small collective farms began to merge into larger ones; in 1955, there were 400 large collective farms.

After World War II, electricity became available for daily use in the villages and for agricultural production. More than 100 village power plants were in operation in 1955. A large number of collective farms are also using electric power from the rayon centers.

Science also came to the aid of agriculture: dozens of institutes, experimental stations and fields, nurseries, botanical gardens, and experimental animal-breeding farms are now in the service of every branch of agriculture.

Irrigation gets particular attention in view of the dry climate. The primitive methods of prerevolutionary irrigation were based on utilizing the small swift-flowing rivers. Little use was made of the large rivers requiring complicated installations, and considerable stretches of usable land therefore remained desert-like. Characteristic of the soviet period was the utilization of the large rivers and the irrigation and cultivation of the previously untouched vast desert-like land areas.

Large irrigation installations had been built in Central Asia before the Great Patriotic War. Among them are the Large Fergana and Northern Fergana canals which made it possible to irrigate tens of thousands of land plots in Uzbekistan and the northern part of Tadzhikistan. The Vakhsh Valley is now irrigated for the first time with the aid of a

large irrigation ditch and water-retaining dam. The newly-built Large Gissar Canal has already irrigated many new lands and improved the irrigation of the old ones. Similar projects were completed in other parts of the republic. They were built as national construction projects, with the participation of the broad masses of collective farmers. These people performed real miracles of labor heroism. For example, the 270 km-long Large Fergana Canal was built in only 50 days.

Tadzhik agriculture is highly diversified and includes cotton raising, fruit growing, viticulture, stock breeding, silk production, and the production of grain, oleogenous, vegetable, and citrus cultures. These cultures are of varying commercial values. The kolkhozes producing the bulk of the commercial agricultural products get the largest part of their income from cotton raising. The Tadzhik kolkhozes get a considerable income also from the other branches of agriculture which rate high in the national economy: animal husbandry, silk production, vegetable and fruit growing, and the production of citrus cultures, geraniums, and tobacco.

The economic activities of the population in different districts vary with the prevailing natural conditions. In the lower valleys, cotton is the major crop. Grain production, animal husbandry, silk production, fruit growing, and viticulture play an important part on the mountain slopes and in the medium-altitude valleys. These industries also extend to the high-altitude valleys, but there they yield in importance to animal husbandry. In East Pamir, animal husbandry is the sole occupation of the rural population.

The Tadzhik collective farmers are becoming wealthier from year to year. The income of the cotton-growing kolkhozes is particularly high. The average income of a cotton-growing kolkhoz is now about 8.5 million rubles. Some collective farm families make a considerable income. The income of the kolkhozes and sovkhozes not producing cotton or other valuable technical cultures is considerably lower. That income has been increasing since 1953 when the state purchasing prices of animal products, potatoes, vegetable, and other agricultural produce were raised. The best way to improve the welfare of the working people was to resettle part of the land-poor upland collective farms in the cotton-growing valleys. By cultivating the new stretches of virgin land, the resettlers have become wealthy within a short period of time. Many tens of thousands of small farms have thus been resettled in the postrevolutionary period. Many more farms will be moved from the uplands to the lower valleys in view of the cultivation of new lands there.

The mountains and uneven topography restrict the use of the land for crops, animal husbandry, and other branches of agriculture. Two thirds of the land are unusable. There are about 4.8 million hectares of land

suitable for agricultural purposes, but only 1.3 million hectares of that land is adaptable for ploughing. The total crop area of the republic is now 800 thousand hectares, which is about twice as much as in 1913. Thus the ploughable land of the republic is to a large extent already in use. Herein lies the difference between mountainous Tadzhikistan and flatland Uzbekistan, particularly Turkmenia, where only a small part of the entire area is suitable for ploughing purposes.

Radical changes have been made in the structure of the crop fields. In 1913, grain cultures accounted for 89% and industrial cultures for 8% of the entire crop area; in 1953, the corresponding figures were 57% and 35%. The major industrial culture now is cotton.

In Tadzhikistan, as in the other republics of Central Asia, crops are raised on both irrigated and unirrigated ["bogarniye"] lands. The former account for approximately 1/3 of the entire crop area. Most of the irrigated land is in the valleys where precipitation is low and the climate is warm. These lands are used for the most valuable cultures: cotton, jute, volatile oil plants, as well as vegetables, rice, and fodder cultures. Most of the unirrigated land is on mounted slopes where the humidity is high, but the growing season is short. The unirrigated land is used primarily for grain (wheat and barley), bean and oil-bearing cultures (flax, sesame, and safflower). The unirrigated land area is twice as large the irrigated, but the importance of the agriculture under irrigation is immeasurably greater.

The leading item of Tadzhik agriculture is cotton. Compared with 1913, the area planted to cotton has been increased more than 5-fold, and the total cotton crop 13-fold.

The bulk of the raw cotton is produced by the collective farms. In the South the state farms play an important part in cotton production. Some of the collective farms not only grow industrial cotton, but also produce superior types of seeds for the collective farms. There are 5 large cotton-growing state farms in operation at present.

The 2 kinds of cotton produced in Tadzhikistan are medium-fiber and thin-fiber cotton. The production of the latter was started in the republic in 1929 and it now accounts for 1/3 of the entire cotton crop. It is distinguished for its high quality. The fiber of this kind of cotton is about 1½ times longer, stronger, thinner, and silkier than the medium-fiber cotton and is used for the production of cloth for high-quality clothing and other industrial materials. But this cotton requires a warmer climate and is therefore planted in the lower and warmer valleys. The medium-fiber cotton is planted up to an altitude of 1,000 m while the thin-fiber cotton area does not exceed 500 m above sea level.

Four-fifths of the cotton growing area is in southern Tadzhikistan. Almost all the thin-fiber cotton is concentrated in the Vakhsh, Kafirnigan, and Kirovabad valleys, where the sum total of the temperature for the period with a daily average of below 15° is between 4,000° and 5,000°.

The soviet seed-selection experts are developing original types of cotton adaptable to the continental conditions of Central Asia. Having undergone constant improvement, the quality of these grades of cotton is now higher than that produced elsewhere in the world.

The selection of various cotton grades is designed to increase their yield and their fiber length, achieve early ripeness, make them disease-resistant, and make their growth sufficiently compact for machine-harvesting, etc. Engaged in the development of new grades of cotton is the Tadzhik Zonal Cotton Experimental Station in the Vakhsh Valley as well as a wide network of cotton grade-testing and selective seed-growing farms. Various grades of cotton in Tadzhikistan have been completely replaced by superior grades in the past 25 years. Most of the medium-fiber cotton grades produced in the republic are 138-F, 123-F and 108-F, and the most popular among the thin-fiber grades are 504-B, 2363-B and 5904-I (developed by Turkmenian scientists). New grades have already been developed to replace these, as for example the new thin-fiber cotton 5010-B or S-8017. The latter has a number of good qualities: it ripens early, has minimum branching, is resistant to certain diseases (gummosis and fusariosis) and, what is particularly important, it requires no chemical processing for the removal of its leaves, as it sheds them by the end of the growing season.

Practically all the labor processes connected with cotton growing are mechanized. The current problem is that of mechanizing the most labor-consuming operation of picking raw cotton. Cotton picking machines which raise the production output and make the work of the cotton farmers easier are now in operation on the fields of the republic.

The leading cotton workers in Tadzhikistan are constantly improving the technique of cotton growing and finding new methods of raising the cotton yield. They developed a method to reduce the spaces between rows on cotton fields, which led to an increase in the quantity of cotton plants per hectare and a considerable increase in the yield. By narrowing the distances between rows from 70 cm to 60 cm, it became possible to raise the cotton yield by several centners per hectare. A further narrowing down to 45 cm, produced a considerable additional increase in the yield. The narrow interval method is now used exclusively in cotton planting as is the progressive square-cluster method. Used besides the 2 mentioned methods is the additional surface feeding of the plants and more rational irrigation method, etc.

All these measures made Tadzhikistan second in the Soviet Union as regards the total volume of the cotton crop, and first in cotton yields. The yields derived from one hectare in the republic in 1954 amounted to 28.1 centners of medium-fiber cotton and 23.4 centners of thin-fiber cotton.

Great problems connected with the improvement of cotton growing in Tadzhikistan were outlined by the Council of Ministers USSR and the Central Committee CPSU in a special decision published on 6 June 1954. By 1960 the average cotton yield is to be raised to 32.7 centners per hectare: medium-fiber cotton to 34.8 and thin-fiber cotton to 30 centners per hectare. Various measures for the successful solution of these problems have already been developed; foremost among them is the expansion of the land under irrigation, already mentioned before, and the further mechanization of production.

Among the other southern industrial cultures raised in increasing quantities on irrigated land, are various types of volatile oil-bearing plants and tobacco. Tadzhikistan is an important center of volatile oil plants in the USSR (geranium, the kazanlyk rose, etc). Geraniums had been raised here even before the Great Patriotic war, but now hundreds of hectares are planted to that culture. Volatile-oil-plant growing is concentrated in the Gissar and Vakhsh valleys where the oil is extracted from those cultures in special plants.

The cultivation of the tropical bast fiber plant, jute, was started in the republic several years ago. The jute fiber is used for making ship rope, canvas, sugar sacks, and other products which do not absorb moisture. Jute is raised on the irrigated fields of the warmest valleys in South Tadzhikistan. It covers comparatively small areas and is raised in the collective and state farms of the Kirovabad and Moscow Rayons.

The great possibilities of raising vegetable and melon cultures in Tadzhikistan are well known: in the warm lower valleys one can raise 2 crops of potatoes and vegetables a year. These cultures came in for a great deal of attention. In 1940 the total area planted to these cultures was 4 times as large as in 1913. But this branch of agriculture later began to lag behind the growing demands of the population and industry. In 1952 the total potato, vegetable, and melon area was even smaller than the prewar area, and the yield lower. But vegetable production has been getting more attention since 1953. The party and the government charged the agricultural workers with the task of producing potatoes and vegetables in sufficient quantities to meet the demand of the population and the processing industry as well as the demand of the animal industry for potatoes. New potato-vegetable zones have been established, hot house combines are under construction, and special vegetable-growing brigades are working around the cities, industrial centers, and canning plants.

Crop planting on unirrigated land is an important part of the work of the rural population. Five hundred thousand hectares of grain, bean and olive varieties are watered by precipitation alone. The unirrigated crop area begins at a 600-800 m altitude and extends up to 3,400 m above sea level. Vast tracts of such land are concentrated on the relatively flat northern slopes of the Turkestan mountain range, in the Gissar Valley area, and on the southeastern hilly plains. The annual precipitation of 400 mm is sufficient to maintain stable crops. The major portion of the unirrigated cultures consists of grain, particularly wheat. Second place is held by barley, third by oleagenous cultures, and fourth by beans.

In the mountains of Tadzhikistan ordinary, or "soft," grades of wheat are grown which are drought-resistant, crumble-proof, and have a high albumin content. But the grain itself is small and the yield comparatively low. A similar situation obtains also in the case of the other local unirrigated cultures — grains, beans, olives, and lucerne. This prompted the government to reorganize the whole seed-raising business. A wide network of state seed-selection and seed development stations was opened for that purpose, including a number of rayon seed farms and seed-testing plots. After several years of hard work, the selection specialists succeeded in developing a number of good grades of cultures requiring no irrigation. Well-known are the outstanding achievements of the selection expert I. G. Sukhobrus, who managed within a short time to develop high-yielding grades of wheat, barley, lentils, sesame, and other cultures which are now grown on a large scale by the collective and state farms of the republic. The yield of the new cultures he developed ("Surkhah 5688" winter wheat, "Khodzhrau-18" barley, etc) is 15%-20% higher than that of the grades they replaced. And now almost the entire unirrigated ploughland is planted with high-grade seeds. Another important agricultural practice, hitherto practically unknown in the Bokhara khanate, is the planting of winter crops on unirrigated land. Most of the wheat and part of the barley are now planted in autumn and produces a crop 1½-2 times as large as the summer crop.

The most popular of the oleagenous cultures is the oil-bearing or curly flax ["lyan-kudryash"] ("zigir'" in Tadzhik). Crowded off the lower valleys by the expanding cotton plantations, this flax is now grown in all the mountain districts. Comparatively small areas are planted to the very valuable oleagenous cultures, sesame and safflower. Sesame is raised in all the warmer low-mountain areas but safflower only in North Tadzhikistan.

Tractors are used towork most of the unirrigated crop land, and the grain is harvested with combines. Draft animals are used only in high-altitude districts where the crops are scattered in small plots or on steep slopes, and the harvesting is done manually.

Horticulture and viticulture have always been profitable branches of agriculture in the republic. Tadzhik canned and dried fruit -- dried apricots, "kuryaga", currants, as well as various grades of wine -- are famous throughout the Soviet Union and abroad. There are more than 20,000 ha of orchards and 8,000 ha of vineyards in the republic.

Apricots are the major fruit used by the local canning industry, and dried apricots are used for exports. The most unpretentious of all fruit cultures, the apricot tree, grows almost everywhere in Tadzhikistan except in East Pamir. But most of the apricot orchards are concentrated in the Fergana and Zeravshan valleys. The other fruit varieties grown in the republic include peaches, apples, pears, plums, cherries, quinces, wine berries, and native plums.

Grapes have been grown in Central Asia since times immemorial. Horticulturists have been selecting and developing the best grades of grapes, particularly of the raisin variety, and achieving remarkable results. But the vineyards are not evenly distributed over the republic; about half of them are concentrated in the Ura-Tubinskiy Administrative Rayon. The Gissar Valley is becoming an important viticultural district.

A large number of orchards and vineyards were planted after the October Revolution Seven new fruit-and-grape state farms were established in the southern part of the country for the purpose of supplying the expanding canning and wine-making industries and the population with grapes and fruit. Fruit nurseries opened in many parts of the country are supplying the collective farm orchards with planting materials. The kolkhozes and sovkhozes have begun to grow lemons and oranges in special trenches. But the progress made in this branch of agriculture is still inadequate. The population's demand for fresh fruit and grapes, and the canning and wine-making industries' requirements of raw materials have not yet been fully met.

Animal husbandry is a well developed and profitable branch of agriculture in Tadzhikistan. In 1955 there were 3.6 million head of cattle of all types in the republic. Four-fifths of that number consisted of sheep and goats, and the rest were cattle, horses, donkeys, and camels.

Three-fourths of all the animals are concentrated on collective farms. Each kolkhoz has its own cattle and poultry farms; many kolkhozes have also pig-raising farms. Much attention has been focused on the problem of increasing the herds, particularly in the postwar years, and such increases have indeed been very rapid (in 1952 the kolkhoz herds were 4.5 times as large as in 1939). One-fourth of all the cattle are in the animal-raising state farms and in the personal possession of kolkhozniks.

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The historical and natural conditions obtaining in the different parts of the republic tended to produce different breeds of domestic animals. Some of the districts raise highly valuable breeds of such animals. The famous Gissar sheep was developed several centuries ago in the southern districts, where rich winter pastures are abundant and excellent summer pastures are available nearby. The Gissar sheep is the most productive breed in the world as regards of meat and fat. The average live weight of a Gissar ram is 100 kg, and of a ewe 80 kg. The tail of the average Gissar ram weighs 15-20 kg, while that of the larger breed of Gissar rams may reach 40 kg. This breed is the most common among the herds.

Another local breed of sheep, the Darvaz, was developed in the mountainous areas of central and eastern Tadzhikistan, which in the past were isolated from the winter pastures by natural and political borders. These are among the smallest sheep in the world. The live weight of a Darvaz sheep is about 30 kg, and its yield of comparatively coarse wool is only about 500-700 gm.

Valuable astrakhan sheep are raised in the semidesert southwest districts of the republic. Astrakhan fur production is an important item in the republic's economy.

Most of the goat herds, particularly in the mountainous districts, are of a local general breed. But the number of Angora goat cross-breeds has been increasing since 1936.

The republic is justifiably proud of its Lokay horses. This breed was developed from the Mongolian horse but its present qualities have been acquired under the difficult conditions of mountainous topography. It is mainly a pack and saddle horse. Under saddle, it is known for its fast trot, the "dzhurga." It can travel with a 6-7 pood pack up to 80-100 km a day on steep mountain paths.

The Karabayr breed of horses is raised in North Tadzhikistan. The Karabayr breed was developed on the plains; it is heavier than the Lokay breed and is used mostly as a draft horse.

Yaks are raised in the open spaces of East Pamir at altitudes of about 4,000 m above sea level; the yak is the only transportation animal capable of working at such altitudes, and it produces milk with a very high fat content.

The upkeep of the animals, particularly sheep and goats, consists in the utilization of available pastures and the use of coarse fodder in the winter. There are about 3 million hectares of natural pastures in Tadzhikistan, but the area under hay and planted grass is less than 150,000 ha.

From the seasonal point of view, the pasturelands in the republic are divided into 3 kinds: summer, winter and spring-autumn pastures. The summer pastures, abounding in fodder, are located in the high-mountain districts and are accessible 3-4 months out of the year. The winter pastures are fewer in number and the fodder there is rather meager; most of them are concentrated in the valley-and-foothill zone and are used 5-6 months during the year. There are few spring-autumn pastures, and they are used as intermediate grazing land.

The seasons for driving the cattle to different pastures vary with the different parts of the country.

In South Tadzhikistan the cattle spend the winter in the pastures of the lower valleys and foothills, and the summer on the slopes of the Gissar Petr Pervyy, and other mmountain ranges.

Following is the schedule of large-scale cattle shifts to different pastures during the year.

By the end of November, hundreds of thousands of head of cattle, mostly sheep, are concentrated on the winter pastures of South Tadzhikistan. This is not only local cattle; sheep are also driven here from Central Tadzhikistan (formerly Garm Oblast) hundreds of kilometers away, from the Gissar Valley, and even from the Zeravshan Valley. The grass here is rather meager, but the absence of snow makes it easily accessible. In the coldest months the animals are also provided with hay which has been prepared in the spring. The new grass begins to grow in February. And that is also the lambing and sheep-shearing season. The herds are then gradually driven northward, and by May the winter pastures are completely abandoned. The mountain pastures are reached by the sheep in June. They are fattened on the subalpine and alpine grasses and their tails increase in size; the lambs born in the spring multiply their weight 8 to 10 times in the summer. At the end of September, when the cold season begins, the flocks of sheep are driven back to the winter pastures.

The kolkhozes of North Tadzhikistan, where seasonal pastures are few, drive most of their flocks to the neighboring republics of Kirgizia, Uzbekistan, and Kazakhstan. Large pasturelands were set aside for the kolkhozes in the Kyzylkum desert where many of the North Tadzhik cattle herds spend the whole year.

The kolkhozes of western Pamir, where pastures are very scarce, drive part of their cattle to East Pamir for the summer period, but keep them on their own land in wintertime as there is little snow there in the winter. Much of the West and East Pamir cattle is kept all year round in the Alay valley (Kirgizia).

Animal husbandry gets a great deal of attention in the republic. Much work is being done to increase the herds and raise their productivity. There are 11 animal-breeding state farms in the republic; among them are sheep-breeding farms specializing in Gissar and Astrakhan breeds, cattle raising farms where the local low-productive cattle is being improved, and state farms where yaks and horses are raised. State farms were opened in various districts for the development of pedigree cattle, and pedigree animal departments were opened also in the collective farms.

Fine-and medium-wool breeds of sheep have been developed in recent years by cross-breeding the mountain merino with the Darvaz sheep. The cross-bred sheep weighs twice as much as the Darvaz sheep and its high-grade wool is 5-6 times as valuable. Many of the mountain kolkhozes are now beginning to breed their own profitable fine-and medium-wool sheep.

Further efforts to improve the breed of Gissar sheep have been made since 1947; the large specimens of ewes already developed weigh up to 120-130 kg, and rams up to 150-160 kg.

Raised on a large scale in southwestern Tadzhikistan is the Astrakhan sheep, of which there had been very few before the revolution; they are now raised on 4 large state farms.

Several male Angora goats were brought to northern Tadzhikistan in 1936, and Angora cross breeds can now be found in every district. The high-grade wool yield of the hybrid sheep is several times that of the local breed of goats.

One of the most complicated problems is to raise the productivity of large horned cattle. The average live weight of a local cow is 200 kg, but her annual production of milk, which has a high fat content, is only 300-500 l. This low productivity is due to insufficient fodder and to the fact that many cows are kept on the pastureland and get very little hay in wintertime. Placing the cows in stalls, full- or part-time, would lead to a sharp increase in their milk production. In some of the sovkhozes (Garm, Stalinabad, and Kuybyshev) and progressive kolkhozes where the cows are kept in stalls, full- or part-time, their annual milk production has gone up to 1,500-2,000 l per cow. An improvement in the breed of long horned cattle also tends to raise its productivity: the cows sired by the "Shvitz" bull are 1½-2 times heavier and their milk output 5 to 8 times greater.

But it is impossible to improve cattle productivity without improving the fodder base and mechanizing the cattle breeding industry as a whole. The government has been appropriating large funds, allocating much

machinery, and mobilizing scientific and technical forces with a view to solving that problem. The mechanization of the stock-breeding industry is facilitated by the MTS, which are equipped with the necessary machinery for hay mowing and baling, fodder silaging, well digging, electric sheep-shearing and cow milking, etc. Electric shearing facilities are now used for most of the sheep in the republic.

Much work is now being done to improve the natural pastures and hay-fields; many kolkhozes and sovkhozes are irrigating their winter pastures which were little used previously due to the lack of water; some of the winter pastureland is planted to grass and grain cultures; experiments on pastureland rotation (alternating between the use and improvement of such lands) are being conducted in southern Tadzhikistan. All these important measures are designed to solve the fodder problem (since it is precisely the winter pastures that limit the qualitative and quantitative improvement of the herds), and they must therefore be considerably improved.

Particular attention should be focused on the dairy cattle, for which the winter pasture and the usual amount of added fodder in the winter months are insufficient. This cattle requires a large variety of succulent fodder: concentrates, silo, hay, planted grasses, and edible roots. There are many possibilities in the republic for producing such fodder cultures, particularly corn which yields 400-500 centners of cobs or 35-40 centners of grain per hectare of irrigated land.

Silkworm breeding is another important branch of agriculture. In recent years Tadzhikistan has been producing up to 2,000 t of cocoons annually, which is more than 2½ times as much as in the prerevolutionary period. All the cocoons are used by the local silk industry.

Silkworm breeding is more advanced in the lower valleys, particularly in the western part of the Fergana Valley, an old silkworm district, which produces more than half of all the cocoons. That district, however, has been yielding in importance to southern Tadzhikistan, where silkworm breeding, especially in the mountain areas, is becoming one of the most profitable branches of agriculture.

Silkworm breeding calls for much work and skill. It involves the following basic processes: the revival of the graine (silkworm eggs), feeding the caterpillars until they reach the stage at which they begin to weave their cocoons, starving the immured caterpillars to death and, finally, drying the cocoons. The other processes -- unwinding the cocoons, spinning the thread and weaving -- are performed by the industry.

For a number of centuries the methods used for silkworm breeding were very primitive: the grains purchased by the sericulturists were handled under domestic conditions; the caterpillars were fed in the house and the cocoons dried in the sun. All that was changed under the Soviet system. Plants designed to raise cocoon grains were built in Khodzhent in 1919 and in Stalinabad in 1932; state incubator houses for reviving the grains and a large number of cocoon-drying installations were opened in many places. Considerable success was achieved by the grade-testing stations which developed a more productive hybrid grains.

Progress in the development of silkworm breeding depends largely on the food base. In the prerevolutionary period, the only mulberry tree cultivated in Tadzhikistan was the tall-stem type. The mulberry trees growing on the fields and lining the highways were a familiar feature of the landscape. The bush-like ["kustovaya"] mulberry tree, introduced under the Soviet Government, produces leaves on the second or third year after it is planted. Mulberry-tree nurseries were organized for supplying the kolkhozes with seedlings.

These measures have made it possible to get a larger number of cocoons out of the grains pod.

(The grain pod weighs only a few dozen grams while the cocoons obtained from it weigh up to several dozen kilograms. The average output of cocoons per grains pod in Tadzhikistan has been fluctuating, but the overall trend has been toward an increase: 23.4 kg in 1913, 16.9 kg in 1932, 38.3 kg in 1938, 31.1 kg in 1940, 38.7 kg in 1942, 43.8 kg in 1953, and 39.1 kg in 1955. By using scientific methods, the most skillful khakhaz sericulturists get as much as 100-120 kg of cocoons per grains pod.)

But despite all the achievements of agriculture, the favorable natural conditions of the republic, the technical equipment of agriculture, the achievements of science, and the outstanding productive skill of the population are still poorly utilized. Some branches of Tadzhik agriculture are developing slowly. Lagging behind are grain production, vegetable and potato growing, fruit growing and viticulture, and particularly some branches of animal husbandry. The main problem now is to step up the overall production of grain for human consumption and fodder purposes. This may be achieved by expanding the areas planted to these cultures and increasing their yield. Corn must become one of the major fodder items as it is possible to raise 2 corn crops a year on irrigated land.

There is usually a big shortage of potatoes, which the Tadzhik cities have to import from the central districts of the USSR. The experiences of many years have shown that there are favorable conditions for potato

growing even in the mountainous districts of the republic. Thus in the Surkhob River Valley near Stalinabad, for example, potato raising could be developed into an important branch of agriculture.

The old orchards and vineyards concentrated on the rich land, especially in the northern districts of the country, require a great deal of improvement; commercial orchards and vineyards should be planted around Stalinabad, Kurgan-Tube, and other cities of the southern districts as soon as possible.

The republic's animal husbandry is faced with the important task of doubling and tripling the output of meat, milk, and other animal products during the Sixth Five-Year Plan. This problem could be realized if the fodder resources were considerably increased. Since the natural pastures are the major source of fodder, they should get the most attention. The grazing lands should be watered. The winter pastures should be planted to grass and grain cultures to provide better fodder and hay.

One of the major targets in the development of the cattle-raising industry is higher cattle productivity, especially higher milk production. The time has come to adopt the tried and tested system of feeding the dairy cattle in stalls in wintertime and in part-time stalls in the summer, and to improve their breed at the same time. The methods of raising fine-wool sheep and fur-bearing goats should be improved by cross-breeding the Darvaz sheep with the rams of the local mountain breed and the local goats with male Angora goats.

Silkworm breeding is also lagging far behind the demands of the expanding silk industry in the republic. It has become urgent to improve the system of caterpillar-feeding, to introduce accelerated methods of such feeding, to plant more mulberry trees, and take other measures.

The collective and state farms of Tadzhikistan have all the possibilities for developing a diversified economy to include highly profitable branches of agriculture in addition to cotton raising.

Industry

Central Asia has been famous for its comparatively high level of economic and cultural development since the most ancient times, particularly by the end of the first thousand years AD (in the era of the Samanid state). A considerable portion of the population was at that time settled on the land, and comparatively large cities, handicraft and trade centers, existed everywhere. Many of those cities are still in existence: Leninabad

(formerly Khodzhent), Ura-Tube, Samarkand, Khiva, etc. There was a well-developed and highly diversified handicraft industry: the artisans produced a variety of household and luxury goods; mining was also an important part of the handicraft industry.

But the peaceful economic development of that region was interrupted by the frequent invasions of Central Asia by various conquerors. This resulted in the destruction of the irrigation systems and cities and the plundering and looting of the population. The internecine struggles led to similar results.

The annexation of Central Asia to Russia in the second half of the nineteenth century changed the economic life of the region, particularly in Tadzhikistan's Leninabad Oblast, which was then under the Governor-General of Turkestan. The economic development was now determined by the colonial policy of tsarism; major attention was focused on the branches of the economy which were of interest to the merchants, industrialists, and bankers. Progress was made in cotton growing, horticulture, silk-worm breeding, and industry connected mostly with the processing of agricultural raw materials. A number of small cotton-processing plants, a silk-weaving mill, a glass making plant, and several primitive oil mills were built at the end of the past and the beginning of the present century in the city of Khodzhent and its outskirts. Coal mining and oil extraction were started on a small scale on the Shurab coal fields and the Sel'-Rokho oil fields.

The inclusion of Central Asia's economy, as well as the economy of the northern part of what is now Tadzhikistan, into the sphere of influence of the more advanced economy of Russia created close economic relations between Central Asia and the mother country. This was greatly facilitated by the construction of a railroad line connecting Central Asia with Central Russia. The region was gradually drawn into trade relations with the outside market. There was an increase in the exports of raw cotton to the cotton industry centers of Russia. Exported also were large quantities of dry fruit, cocoons, and silk products. Shipments going in the opposite direction consisted of increasing quantities of Russian manufactures: cotton goods, rubber footwear, metal products, and other mass-consumption goods.

But neither expanding industrial production nor increased imports of industrial manufactures were sufficient to meet the demands of the region for industrial goods. The local handicraft industry was therefore the major source capable of meeting that demand. That latter consisted of a number of branches such as oil milling, confectionery making, flour milling, and soap making as well as cotton, wool, and silk production.

Among the other well-developed branches of the cottage industry were iron production, cast iron smelting, blacksmithing and gunsmithing, carpentry, pottery, and brick making. There was a large number of leather, footwear, clothes-making and other shops everywhere. The principal centers of the handicraft industry in prerevolutionary Tadzhikistan were in the cities and communities of Khodzhent, Ura-Tube, Kanibadam, Penzhikent, Kulyab, Gissar, Dushambe, Karatag, Kurgan-Tube, Garm, and some communities of Pamir. Khodzhent, Ura-Tube, and Gissar had a more advanced handicraft industry than the other centers. Its output was designed both for the home market and for export. There were over 300 handicraft industry enterprises in Khodzhent in 1917 with a total annual output of almost 400,000 rubles.

Larger industrial enterprises in Tadzhikistan were considerably fewer in number. In 1913 there were only 6 such enterprises in the northern districts of Tadzhikistan, which were then part of Russia: 4 cotton processing plants and 2 fuel-making enterprises with a total production of 855,000 rubles and employing a little over 200 workers. In eastern Bokhara (now South Tadzhikistan) there were no large industrial enterprises at all.

Favorable conditions for the organization of heavy industry and the transition from handicraft production to modern mechanized enterprises in Tadzhikistan were created after the victory of the Soviet system. The restoration of agriculture, ruined during the Civil War, was accompanied by the construction of a new industry. An electric power plant, a flour mill, a cotton-processing plant, an oil mill, and a soap-making plant had been built in Dushambe by the end of 1926. Fifteen comparatively large industrial enterprises with a total production amounting to 6.3 million rubles were already in operation in 1928. The total number of workers employed was 430.

The growth of the heavy industry was accompanied by a restoration and reorganization of the cottage industry on a cooperative basis. At the end of 1928 there were several cooperative industrial artels producing building materials, agricultural implements, and various consumer goods.

The industry built in those years was not very large, but bearing in mind the fact that it had been built from scratch on roadless land, where building materials had to be brought in by pack animals and lumber had to be dragged in, its achievements become more conspicuous.

The Tadzhik industry was expanding at a rapid tempo during the prewar five-year plans. That was determined by the policy of the Communist Party, designed to industrialize the backward agrarian districts of which Tadzhikistan was one.

Eighty three million rubles, most of it taken from the all-union budget, were invested in industry during the First Five-Year Plan when the republic's domestic income was still insignificant. More than 10 different branches of industry, supplied by the abundant reserve of local raw materials, grew up within a few years. The leading industries were cotton-processing, fruit canning, flour milling, as well as metal processing (mostly for repair purposes in connection with the expanding mechanization of agriculture, irrigation, and road construction). In 1933 these 5 industries accounted for almost 70% of the value of the entire industrial output. As a result of the implementation of the First Five-Year Plan, industry began to play an important part in the national economy of the republic. Built during those years were such large enterprises as the Leninabad Silk Combine and the Kanibadam and Leninabad fruit-canning combines. A total of about 100 large enterprises went into operation in the republic. The 1933 output of the entire industry amounted to 66 million rubles (reckoned in 1926-1927 prices).

Almost 200 million rubles were invested in industry during the Second Five Year Plan. The industries built during the period were expanded and new ones added. New mines and enriching plants, including the Kansay Polymetal Plant, were built near the rich Karmazar mineral deposits. A power industry came into being. The Vazorb Hydroelectric Plant, the first in the republic, went into operation. The newly commissioned enterprises were larger and better mechanized. Many factories and plants were under construction in South Tadzhikistan, particularly in Stalinabad. The industrial output went up to 228 million rubles (measured in 1926-1927 prices) in 1938, and the number of large industry enterprises to 220.

Close to 330 million rubles were invested in industry during the Third Five-Year Plan. The outbreak of the Great Patriotic War prevented the implementation of the planned program, but despite that, the total volume of Tadzhikistan's industrial output in less than 4 years of the Third Five-Year Plan was increased by more than 1½ times. Several dozen large new mechanized enterprises went into operation; among them were the Stalinabad Meat-Packing Plant, the Stalinabad Cement Factory and the mechanized mines of the Shurab coal basin with an annual production capacity of 500,000 t of coal.

A total of 600 million rubles was invested in industry during the prewar five-year plans, the investments in industry grew at a more rapid pace than those in agriculture, even though agricultural development was also very rapid.

The enterprises underwent constant improvement: the capacity of the power installations, machines, apparatus, and mechanical transportation was steadily growing. The use of electric power (per worker) during that period was increased almost 5 fold.

This resulted in the creation of a multibranch industry in Tadzhikistan during the five-year plans, producing hundreds of different types of manufactures (as against 10-15 in 1928) both for consumption and production purposes. During that period the number of industrial enterprises was increased 18 times and the number of industrial workers over 50 times.

During the Great Patriotic War, most of the enterprises were converted to war production, but industrial construction in Tadzhikistan was not interrupted. In addition to many others, the following new enterprises were built in Stalinabad: the first combine of cotton plants and the first large metal processing plant, the "Traktorodetal"; the construction of the most powerful electric power plant in the republic, the Nizhnevarzob State Power Plant was begun. A number of large industrial enterprises went into operation in the northern and southern districts of the republic.

Immediately after the end of the destructive war, Tadzhikistan launched a large-scale program of restoration and further development of the national economy. The republic's industry was developing at a fast rate in the First Postwar Five-Year Plan, as may be seen from the dynamics of its overall industrial output in that period (increase % of the preceding year):

1946	1947	1948	1949	1950
24	28	20	13	10

In 1947 the industrial level was already somewhat higher than before the war, and in 1950 the prewar level was exceeded by 50%. The Kanibadam Foundry and Machine Plant, the Takob Combine of fluorspar plants, the Vakhsh Combine of building material plants, and the Nizhnevarsob State Power Plant went into operation.

The industry of the republic successfully completed its Fifth Five-Year Plan. The following new industrial enterprises were built during that period: the concentration plant of the Kansay Polymetal Combine, the cotton processing plants in Shaartuz and Ordzhonikidzebad, the meat packing plant in Tabeshar, the brewery in Svetabad, the mechanized bread-baking plant in Leninabad, and 7 brick factories and a canning plant in the Ghaptura settlement, etc.

Much was done in the Fifth Five Year Plan to increase Tadzhikistan's power industry. The Kara-Kum, or "friendship of Peoples" Hydroelectric Plant on the Amu-Darya river, the largest in Central Asia, will begin

producing power for North Tadzhikistan as well as neighboring Uzbekistan at the end of 1956. The Perepadnaya State Electric Power Plant on the Vakhsh Canal, to be commissioned in 1957, will produce almost as much power as is now being produced by all the hydroelectric plants in the republic. In 1955, Tadzhikistan's industrial output volume exceeded the prewar level (1940) 2.8 times. During the period under the Soviet Government, the Tadzhik industrial output has been increased several dozen times. A large contingent of qualified industrial and engineering-technical workers, numbering tens of thousands of people, has been organized.

There are great prospects for the further development of the republic's industry in the Sixth Five-Year Plan, to be implemented according to the decisions adopted by the Twentieth Congress of the CPSU. The total volume of industrial production will be increased 1.4 times as compared with the 1955 level. Dozens of large highly-mechanized enterprises will go into operation, among them the second part of the Stalinabad Textile Mill Combine, the Stalinabad Oil and Fat Combine, the Kanibadam Oil Extraction Plant, and a new cement plant.

The structure of the industry was determined by the inexhaustible mineral riches, the necessity of processing the agricultural and other raw materials in the republic, and the demand for various semimanufactures in the republic and other areas of the country (as, for example, concentrates for the mining industry).

There are about 30 different industries in Tadzhikistan, most of them created during the prewar and postwar five-year plans. The industrial structure is undergoing constant change in view of the addition of new enterprises and the changing development tempos of the existing ones. One of the characteristic features of Tadzhikistan's industrial expansion is the increasing relative importance of heavy industry. The share of the heavy industrial enterprises in the total economy is still not very large, but these enterprises are expanding at a rapid rate and playing an increasingly important part in the entire economic complex.

Structurally, the industry may be classified as follows (in % of the total industrial output prices of 1952):

Heavy industry (metal processing, mining, fuel production, and building material production)	13
Light industry (cotton-processing, silk, clothing, leather, footwear)	63
Food industry (canning, wine production, flour milling, and bread-baking)	24

Prominent in heavy industry production are metal-processing, mining (nonferrous metallurgy), and fuel and building materials production.

Before the revolution, metal was processed by handicraft methods only. Household articles, agricultural implements, and tools used in carpentry, woodworking, shoe-making, etc were produced by numerous blacksmiths, coppersmiths, locksmiths, and tinsmiths. After the establishment of the Soviet Government, these artisans became the first workers of the repair shops opened in the cities and settlements of Tadzhikistan. As industry, agriculture, and transportation continue to expand, these shops became highly specialized, some of them being transformed into large mechanical repair plants which also produced parts for machines. Special plants were built also for the production of equipment for the oil and textile industries. The largest of them are in Stalinabad and Kanibadam. All of them are engaged in the processing of imported metal.

Before the revolution, fuel production, just like cotton processing was classified as heavy industry even though it differed little from the handicraft industry in size or in technical equipment. It consisted of the following 2 enterprises: the Shurab Coal Mine and the oil field at the Sel'-Rokho settlement. These 2 enterprises employed a total of 107 workers.

A large mechanized coal combine, Shurab-ugol', was built near the Shurab coal fields under the Soviet Government, and the Isfarin Coal Mine of the local industry was expanded into a huge enterprise. About 600,000 t of lignite were mined in that basin in 1955. The location of the Shurab Coal Basin makes it easy to export a considerable part of its coal to various districts of the neighboring republics, while there is a shortage of this coal in southern Tadzhikistan. Only a small part of the republic's coal deposits, mostly lignite, have been exploited so far. The large deposits of fuel and coking coal at Ravat (the largest coal basin in Central Asia), Kshtuta, and Zidda are still not exploited in view of their inaccessibility.

The KIM Mechanized Oil Extraction Plant and an oil-refining plant were built in Sel'Rokho, and a new oil field Nefteabad, went into exploitation nearby. Under the Soviet Government, oil production in Tadzhikistan was increased 1.7 times. Seventeen thousand tons of oil were produced in the republic in 1955. There are great possibilities for the further development of the Tadzhik oil industry in view of the discovery of new oil deposits in the southern districts of the republic.

The enterprises for the production of building materials were first organized within the industrial cooperative system. But large state plants were built during the First Five-Year Plan, and that industry now has a number of cement, brick, lime, alabaster, and tile plants as well as stone, gravel, and sand quarries. Construction materials are produced in every district of the republic, but the largest enterprises are concentrated in the Gissar, Fergana, and Vakhsh valleys. Some of the largest brick making plants produce several dozen million bricks annually each. The variety of raw materials available for that industry and the growing demand for building materials which are still in short supply are indicative of a promising future for that industry. There is an abundance of raw materials for the production of brick, lime, alabaster and construction masonry practically everywhere. The available raw materials make it possible considerably to increase the capacity of the Stalinabad Cement Plant with its slate department and to build new cement plants in other places. Cement production will be increased 13 times over during the Sixth Five-Year Plan. The Stalinabad cement plant alone will triple its productive capacity in 1957.

Most of the industrial enterprises come under the light and food industries, which account for more than 4/5 of all industrial production. These 2 leading industries comprise approximately 20 different branches of production.

The light industry enterprises are the most advanced, and they produce more than 60% of the entire industrial output. They include raw cotton processing, cotton and silk mills, knit goods factories, clothing and leather footwear factories, etc.

The cotton-processing industry is one of the oldest in Tadzhikistan. Cotton was grown there before the revolution and processed in tiny cotton mills which operated 4-5 months a year. Their total 1913 production was 630 t of cotton fiber. Under the Soviet Government, the cotton-processing industry has been developing along with cotton growing. Cotton production is now the largest industry, and it accounts for one-third of the entire industrial output in terms of value, though its relative output is falling behind that of other industries. There are 15 cotton-processing plants evenly distributed over the cotton-growing valleys of the republic. These modern plants are equipped with powerful hydraulic presses, power installations and highly efficient all-metal brushing devices. The basic production processes are mechanized and electrified. In 1955 the combine output of all of the republic's cotton-processing plants was more than 140,000 t of cotton fiber which was more than 200 times as much as the

prerevolutionary output. This industry is in for a further rapid development in view of the planned expansion of the cotton-growing area within the next 5-6 years. New cotton-processing plants will therefore be built in the Fergana, Gissar, and Vakhsh valleys, and the existing plants expanded.

In the prerevolutionary period, the cotton and silk industries consisted of only artisans' shops selling all sorts of cloth -- mostly of the national variety -- to local customers. In the very first years after the revolution, the artisan weavers were organized into industrial artels and later, during the First Five-Year Plan, large silk mills were built and the above-mentioned experienced artisans came to work in them. The Leninabad Silk Combine was the largest such enterprise in the country; other silk mills were built in Stalinabad and Leninabad. The silk industry now produces annually about 20 million meters of silk and semisilk materials, not only for the population of the republic, but also for export.

Just like the silk industry, the cotton industry did not begin to expand until the five-year plans. The largest enterprise of this industry is the Stalinabad Cotton Combine which is now in the second stage of its expansion. That combine now produces more than 38 million meters of cloth per year. When the second stage of its expansion is completed, its capacity will be doubled. Tadzhikistan's output of cotton cloth in 1955 was 40.9 million meters.

The textile industry is a consummate industry, more than any other in Tadzhikistan: cocoons are unwound, silk thread is spun, and printed cloth produced in the silk industry while cotton is processed, spun, and woven in the cotton industry. There is a difference in the raw material supplies for these 2 industries. The silk industry has already outgrown its raw material base, and much additional effort is therefore required for the further development of silk production in the republic so that it can meet the demands of industry. The cotton industry, on the other hand, uses only a small portion of the fiber produced in Tadzhikistan as this country specialized in cotton production.

Among the other light-industry enterprises built in the republic are large and highly mechanized clothing, knit-goods, and leather-and-footwear-factories and plants. It is planned to build several more enterprises for the processing of raw cotton, the production of clothing, leather and footwear, and a large plant for producing cotton wool. Some of the clothing and leather manufactures is shipped to other parts of the Soviet Union.

The second largest industry by production volume is the food industry. It consists of canning- and dry-fruit-producing enterprises, wine-making enterprises, oil mills, flour mills, bread bakeries, meat packing houses, breweries, tobacco enterprises, etc. This industry now accounts for almost 1/4 of the entire industrial output. It has a diversified and rapidly growing raw material base: fruit and grapes, grain cultures and cotton seeds, vegetables, and animal products.

The canning industry comprises 8 plants, including such large enterprises as the Leninabad and Kanibadam Fruit Canning Combine and Stalinabad Meat Canning Combine. This industry produces annually about 40 million standard-size cans of desserts, preserves, jam, meat, meat and beans, and vegetables. Most of these goods are shipped to various parts of the Soviet Union, including the Far East and the Extreme North.

The wine-making industry is, in a literal sense, a new industry, as old customs and religious prejudices prevented the local population from producing wine for sale before the October Revolution. The wine industry now comprises 5 plants producing various kinds of grape wine. There are great possibilities for the further expansion of this industry, particularly in the south -- in the Gissar and Vakhsh valleys -- where a new raw material base is being organized for it.

The oil manufacturing industry parallels the cotton processing industry, as its basic raw material consists of cotton seed, a by-product of the initial cotton processing. Before the revolution, that industry consisted of the primitive "dzhuvaz" - type oil mills producing 2-3 kg of oil a day. There are 7 oil pressing plants in operation now; they are located next to the cotton-processing plants so that the cotton seeds can be utilized on the spot. But the capacity of the existing plants is insufficient for processing all the seeds produced by the cotton plants, so that a considerable part of those seeds have to be shipped to other plants, and even to the neighboring republics, which is economically unprofitable. That situation is now being remedied. A huge oil extracting plant, one of the largest in Central Asia, will soon go into operation near the city of Kanibadam. (A chemical extraction method is used whereby the oil is drawn out of the seed with the aid of benzene steam. As a result less than 0.4% of oil is left in the cottonseed cake, while the oil-pressing method causes a loss of 3.5%.) Out of the planning stage and under construction now is a large oil- and-fat-producing combine in Stalinabad, which will process almost as much cotton seed as is now being processed by all the existing plants in the republic. Oil plants will be built also in the remote areas of South Tadzhikistan from where it is particularly difficult and expensive to move the cotton seeds.

A number of enterprises designed to meet various important demands of the population, such as bread and pastry, meat and dairy and other enterprises, account for a large output of the food industry output. Small enterprises of that type, working on local raw materials, are available in almost all the rayon centers, and the large enterprises are in the cities. Among them are such large enterprises as the flour-milling combine in Ordzhonikidzeabad, the mechanized bread-baking plants in Stalinabad and Sovetabad, etc. Under construction is a meat-packing combine in Sovetabad as well as dairy, meat, and confectionery enterprises in various districts of the country.

In addition to the above-mentioned all-union and union-republic enterprises, the local cooperative industry is of some importance to the republic's economy.

The local state industry is a small-scale duplication of the large all-union and union-republic industry. It comprises a variety of metal-processing, woodworking, fuel, textile, clothing, and building-material enterprises and other branches of the light and food industries. Among the largest local industrial enterprises are the coal mine at Isfara and the Metalloshirpotreb (consumer metal) plant, the woodworking plant, and the knitgoods factory in Stalinabad. The construction of a large furniture factory is nearing completion in the same city.

The cooperative industry played an important part in the creation of a large industry. And now the state industry, in turn, is helping the cooperative industry with raw materials, fuel, and equipment. The cooperative industry now embraces 20 different branches producing the following consumer goods: textiles, clothing, footwear, furniture, building materials, metal products, foodstuffs, etc.

But the local cooperative industry is still not making adequate use of the abundant and diverse local resources and the by-products of the state industry; it is still far from meeting the growing demand of the population for building materials, foodstuffs, clothing, objets d'art, and other goods.

The proper territorial distribution of the industry is very important for the development of the productive forces of the republic. Before the revolution, the entire large industry was concentrated in the Fergana Valley. The construction of many new industries under the Soviet Government has changed the industrial distribution pattern. The industry was extended to the strictly agrarian districts of the South. Despite its rapid development, the Tadzhik part of the Fergana Valley produced only 1/3 of the republic's industrial output in 1940. During the same year, the Gissar Valley industry produced 44% and the Bakhsh Valley 16% of the industrial output.

Besides the distribution of industry, the nature of the industrial production in the districts is an important indicator of their industrialization. The Tadzhik industry is closely tied to its local raw material bases. The type of such raw materials is therefore still a determining factor in the industrial development of a particular district.

For example, almost all the enterprises of the mining industry are concentrated in northern Tadzhikistan, where all the known major ore deposits are located. There, too are the lead-zinc combine, rare-metal mines, the largest coal mines, and the only oil-extracting industry in the republic. The age-old horticulture and viticulture facilitated the creation of rapidly expanding canning and wine-making industries. The Leninabad and Kanibadam canning combines and the Ura-Tube and Sovetabad breweries are among the largest enterprises of their respective industries. The same district has always been an important center of silkworm breeding, and that facilitated the creation of a large silk industry. The Leninabad Silk Combine is the largest industrial enterprise in Tadzhikistan. Most of the nonferrous and rare metals are mined in that district, and all the crude oil is extracted there. Also concentrated in this area is 90% of the production of silk cloth and 60%-70% of the output of the fruit-canning and wine-making industries.

The Gissar Valley, particularly the city of Stalinabad, has now become the outstanding industrial area. It alone produces over 1/4 of the entire industrial output of the republic. That city is characterized by a large variety of industries. Indicative of this is the abundance and variety of raw materials brought into it from practically every district of south Tadzhikistan. It is the center of such large republican enterprises as the cotton and meat-packing combines, a brewery, a leather factory, cement factory, metal-processing plants, and some of the largest hydroelectric power plants. The Stalinabad industry accounts for more than 80% of all the cotton cloth produced in the republic, 80%-90% of the leather goods, 100% of the cement, etc.

Industrial expansion is going on also in the Bakhsh and other valleys of South Tadzhikistan. The industry there is designed primarily for processing local agricultural raw materials -- raw cotton, cotton seed, grain, and volatile oil cultures. The foundation was laid also for a Vakhsh Valley industry of building materials and metal processing.

But the republic is still a long way from utilizing all the possibilities for the systematic development of a balanced and diversified industry. Still lagging behind are power production, the building materials industry, oil manufacturing, as well as the fuel, chemical and certain other industries.

The huge reserves of water power available throughout the land present great possibilities for the construction of hydroelectric power plants. The construction of the Kayrak-Kum State Power Plant on the Syr-Darya River is now nearing completion; the Perepadnaya State Power Plant is under construction on the Vakhsh Canal, and the construction of the Golovnaya State Power Plant was started on the Vakhsh River. But hydroelectric plants should be built in other parts of the republic as well.

A large variety of raw materials for the production of building materials is available everywhere: fire clay, high quality quartz sand, pebble, gypsum lime, and marble. The Stalinabad cement Plant is the only one in Tadzhikistan, and its output is far too low to be able to meet the growing demand of the republic's national economy. An automatically controlled plant for the production of ferroconcrete components is now under construction in Stalinabad. But such plants are still lacking in the Leninabad Oblast. There is a constant shortage of bricks and tiles, even though the construction of new brick and tile plants presents no serious problem in view of the abundance of raw materials in various districts. The republic imports window glass and marble products as it has no such industries at home.

Hard coal deposits were found in a number of places in Tadzhikistan but coal is still imported from faraway places. The production of mineral fertilizer is not well developed in Tadzhikistan despite the great demand for it. The deposits of Karatag phosphorites in the Gissar Valley, and other types of raw materials could be used for the production of mineral fertilizer so urgently needed in agriculture.

Special enterprises for the production of mixed fodder are urgently needed for the development of the dairy-cattle industry. There are no such enterprises at present in Tadzhikistan.

The further expansion of industry in Tadzhikistan is contingent upon both the construction of new highly-mechanized plants and factories and the reconstruction of a number of old enterprises which should be equipped with new machinery and the latest production technology.

Transportation

Before the Great October Socialist Revolution, eastern Bokhara was a roadless country. Even wheeled carriages were a rare phenomenon there. The mountain paths could accomodate no more than a pack animal and its rider. The shaky log bridges extending across the swiftly flowing rivers and the "ovringi" stuck to the precipitous walls of the mountain gorges

were not even safe for human beings to cross. (An ovring is an artificial cornice attached to the wall of a mountain gorge and designed to fill the gap in a broken mountain path. It is built from legs and dry branches and covered with stones and clay). Some of the districts in the country, particularly in the mountainous area, were cut off from the outside world, isolated from each other, and their population lived under conditions of a seminatural economy. The railroad line between Ursatyev and Andizhan (Fergana Valley), built in 1897, crossed only the small northern part of what is now Tadzhik territory. All the districts of the southern part of the country were hundreds of miles away from the nearest railroad station. Road construction was therefore one of the most urgent economic problems to be tackled by the Soviet Government.

The construction of the Termez-Dushambe railroad line was begun in 1926 and completed in 1929. A year later it was extended to the eastern end of the Gissar Valley (Ordzhonikidzeabad). The total length of the Termez-Ordzhonikidzeabad line is now about 250 km. That linked South Tadzhikistan to the railroad network of the Soviet Union. Railroads have been under construction also in northern Tadzhikistan. A 42 km railroad line was built in 1938 from Mel'nikovo Station through Nefteabad to the Shurab Coal Field, and a 12 km line was built during the war between Leninabad Station and Leninabad proper (where buses had been the only means of communication).

Railroad transportation plays an exceptionally important part in the establishment of direct communications between Tadzhikistan and the central areas of the Soviet Union. Only the railroad made it possible to send large shipments of equipment, raw materials, fuel, and other materials to meet the requirements of the rapidly developing economic and cultural construction, and to enable the Tadzhik economy to specialize in various types of industrial and agricultural production. The development of the Tadzhik economy as an integral part of the economy of the USSR would have been impossible without railroad transportation. The construction of an industry, an irrigation system, civil and other types of construction, first of all required the importation of building materials, equipment, raw materials, and fuel. Working under favorable climatic conditions and with huge reserves of material resources at their disposal, a number of branches of industry and agriculture were able to expand far beyond the actual needs of the republic. The republic specialized in certain types of industrial and agricultural production, not only in the economic interests of Tadzhikistan alone, but of the USSR as a whole. Direct railroad communication brought the republic into close contact with many areas of the Soviet Union. This made it possible to import equipment, materials, and consumer goods and to export industrial

and agricultural products. The total amount of freight hauled on the broad-gauge railroads in 1940 was 2,600,000 t, which includes about 1,750,000 t shipped from the republic. Thousands of freight trains were required to ship that freight.

The total length of the broad-gauge railroads in the republic amounts to several hundred kilometers. But these roads have not yet been organized into a single railroad network. They run into North and South Tadzhikistan as separate spur-tracks. Moreover, all further construction of broad-gauge railroad lines has been temporarily halted due to the difficult mountainous topography.

But the construction of narrow-gauge railroads, which is less hampered by the mountainous terrain, is proceeding apace. Two narrow-gauge railroad lines were built in 1931-1935. The southern or Vakhsh line connects the city of Kurgan-Tube with the Nizhniy Pyandzh quays. Its original, modest task was to serve the Vakhsh irrigation construction. By that time, regular navigation had been established on the Pyandzh, and the shipments consigned to the Vakhsh construction project were sent from Termez to the Nizhniy Pyandzh quays where they were reshipped by narrow-gauge railroad to the center of the Vakhsh Valley. That line eventually began to handle a greater volume of shipments. The second narrow-gauge line connects Stalinabad with the Bul'bistan quarries 20 km northeast of that city. Its purpose is to deliver raw materials to the building material plants.

The construction of the Stalinabad-Kurgan-Tube line, connecting the Vakhsh and Gissar valleys, was completed in 1941. This established a railroad connection between the rich Vakhsh Valley and the capital of the republic and with the railroad network of the Soviet Union. Shipped by that road to the Vakhsh Valley are machines, fertilizer, gasoline, fuel, building materials, foodstuffs, and consumer goods; the shipments going in the opposite direction consist of cotton fiber, seeds, oil, vegetables, fruit, and other agricultural raw materials. A total of 750,000 t of freight was shipped on that line, in both directions, in 1950. Ten-ton flat cars are now used with a view to increasing the traffic capacity of that road.

The narrow-gauge railroad lines account for a considerable share of freight shipments within the republic. In the first postwar years these narrow-gauge lines handled almost 2/3 of all the freight hauled by every means of transportation not counting the broad-gauge lines. But the rapid development of truck transportation has recently reduced their share of the freight to 1/6 of the total.

The construction of narrow-gauge railroads in Tadzhikistan continues. Under construction now is the important Kurgan-Tube-Kulyab line which will provide cheap transportation for cotton, grain, and other freights shipped from the economically well-developed southeastern area.

Automobile roads were built in Tadzhikistan simultaneously with the railroads, but at a faster rate, and they covered more territory. The preferential development of truck transportation in Tadzhikistan, particularly in its mountainous districts, was determined by definite economic and technical considerations. From an economic point of view, truck transportation is more efficient and cheaper in the mountainous districts where there is no large-scale industry, and freight and passenger movement is limited. That kind of transportation is even adequate for supplying the mountain population with the scarce industrial goods and foodstuffs. The technical reasons are still more obvious. The roads in the Tadzhik mountains run across high mountain peaks (up to 4,000-5,000 m absolute altitude) and along mountain gorges surrounded by almost vertical walls hundreds of meters high, and even where it is possible to build a highway it is often difficult, expensive, and even impossible to build a railroad line.

The first highways connecting Stalinabad and Kurgan-Tube, Sarai-Komar (now Kirovobad), and Kulyab, built in 1925-1927, were comparatively primitive. Their total length was less than 400 km. The construction of better and longer highways was begun in the First Five-Year Plan period. One of the longest highways (732 km) built in 1931-1933 runs between Osh and Khorog. This is one of the highest-altitude highways in the world. It crosses several mountain ranges, including the Alay and Zaalay; its average altitude is 3,800 m but it rises to 4,655 m at the mountain passes. This road brought the mountain Badakhshan Autonomous Oblast closer to the economic and cultural life of the country; in the past, that oblast had been almost completely isolated from the outside world.

But the Osh-Khorog highway was not convenient for communication between the mountain Badakhshan Autonomous Oblast and the other Tadzhik districts. To get to Stalinabad from Khorog, it was necessary to travel by car to Osh and then for 2 more days by railroad in a round-about way through Bokhara (Kagan Station). The big Pamir highways, extending over some 556 km, opened the way to the West. They connected Stalinabad with the Khorog and reduced the previous traveling distance to almost 1/4. That road runs across the mountainous districts of Central Tadzhikistan and provides a great stimulus for the further development of the economy and culture of those districts.

Communication between South and North Tadzhikistan was not completed until the railroad line was built. It takes about 2 days to travel it from beginning to end. The newly built Stalinabad-Ura Tube-Leninabad highway was opened to traffic in 1935. Another direct communication was established between the southern and northern parts of the republic, the road between them having been reduced to 1/4 of the previous distance. That 300 km highway crosses many hitherto isolated and almost inaccessible mountain districts.

The construction of the Stalinabad-Kurgan Tube-Dzhilikul' line was completed in 1937. It had been used even before the Stalinabad-Kurgan Tube narrow gauge line was built, and its importance as the only road leading to the Vakhsh Valley had been particularly great. It is still one of the most travelled automobile highways, even now that the railroad has been completed.

An excellent road between Stalinabad and Obi-Garm, eventually to become the western extension of the big Pamir highway, was built in the same year.

Of much importance for South Tadzhikistan is the Stalinabad-Kurgan Tube-Kirovabad-Kulyab-Stalinabad highway loop.

More than 9,000 km of automobile roads, including over 1,000 km of hard-surfaced roads, have been built in Tadzhikistan under the Soviet Government.

Transportation facilities have been improved along with the roads. The first car arrived in Dushambe in 1925. In 1930 there were only about 320 vehicles in the republic, where now thousands of passenger cars, trucks, and buses are travelling on the Tadzhik roads.

All the vehicles are concentrated primarily in the Ministry of Automobile Transportation and Highways. Large vehicle pools are operated also by other ministries. The number of vehicles belonging to MTS, and state and collective farms has been rapidly increasing in recent years.

Freight hauling is the major function of auto transportation. It accounts for more than 80% of the freight shipments within the republic and for most of the passenger transportation. There are no streetcars in any of the Tadzhik cities, and buses are therefore the only means of city transportation. (A trolley bus has been operating in Stalinabad since 1955). That transportation is used also for interurban and interrayon passenger traffic. There is regular bus transportation between Stalinabad and the nearby towns and rayon centers of Ordzhonikidzeabad,

Koktash, Gissar, Regar, Varzob, Takob, etc. Bus transportation has been established also between Leninabad and Kurgan-Tube and their neighboring rayon centers. Regular bus service over distances of 100 km and more were started also between the following cities: Stalinabad-Kurgan Tube, Stalinabad-Kulyab, Stalinabad-Garm, Pendzhikent-Samarkand, and Leninabad- Samarkand. Also operating on many roads are passenger-car and truck taxis.

Civil aviation in Tadzhikistan had in a way preceded railroad and automobile transportation as the only convenient means of transportation under roadless conditions. Civil aviation is now playing a very important part in the national economy. Stalinabad is connected by airlines with Leninabad, Kulyab, Hovabad, Khorog, and many rayon centers. The planes carry passengers, mail, and freight.

Pack-animal transportation is still of some importance in view of the broken topography. The total length of the pack-animal paths is about 5,000 km. It is difficult to determine the volume of freight carried by pack-animals inasmuch as these animals are used primarily in the collective farms.

6. THE REGIONS OF TADZHIKISTAN

Tadzhikistan's administrative subdivisions are made up of Leninabad Oblast, Mountain-Badakhshan Autonomous Oblast, and a large group of administrative rayons which are directly subordinate to the government of the republic. (By the beginning of 1956, there were 49 administrative rayons in the republic, 5 of them in Leninabad Oblast, 6 in Mountain-Badakhshan Autonomous Oblast, and 31 under government jurisdiction).

The economic differences within the above-mentioned oblasts and the rayons subordinated to the government of the republic on the one hand, and the economic ties among the various administrative rayons gravitating toward certain economic centers on the other, make it expedient to review the republic within the framework of the following 8 economic regions.

In the northern part of the republic, within the limits of Leninabad Oblast, there are 2 economic regions -- the western (Tadzhik) part of the Fergana Valley and the Zeravshan Valley.

Located in the first region is a number of well developed branches of agriculture and industry. The leading branches of agriculture are cotton growing, horticulture, viticulture, and silkworm raising, while the major industrial activities consist of the processing of agricultural raw materials and minerals; there are favorable prospects for further industrial expansion.

Separated from the northern and southern parts of the country by a huge mountain range, the Zeravshan Valley is a region of comparatively small-scale grain and fruit growing and stock breeding; it has prospects for the establishment of an industry for processing minerals.

In the southern part of Tadzhikistan, the administrative rayons under republic jurisdiction are divided into 4 economic regions: the Gissar Valley, Southwest Tadzhikistan, Southeast Tadzhikistan, and Central Tadzhikistan.

The Gissar Valley is the leading region in the production of medium-fiber cotton and the development of various industries, mostly the light and food industries.

Southwest Tadzhikistan, which includes several subtropical valleys, is the major and practically the only region in the republic producing thin-fiber cotton. There are excellent possibilities there for the expansion of cotton growing and the cultivation of other southern cultures.

Southeast Tadzhikistan (formerly Kulyab Oblast) is a region of diverse climatic conditions; grain growing and stock breeding play an important part there in addition to cotton growing.

Characteristic of Central Tadzhikistan (formerly Garm Oblast), all of which is located in the mountainous part of the republic, is grain production on unirrigated land, animal and silkworm breeding.

Finally, occupying the easternmost part of Tadzhikistan is the small Mountain-Badakhshan Autonomous Oblast, which is divided into the following 2 economic regions: West Pamir which is populated by Tadzhiks and has well-developed agriculture and animal husbandry, and East Pamir, populated by Kirgizians, whose only occupation is stock breeding.

The Western Part of the Fergana Valley

That region consists of the western part of the Fergana Valley belonging to Tadzhikistan and the adjacent foothill plains and mountain slopes, and it covers the northern half of Leninabad Oblast, which is separated from the southern half (Zeravshan Valley) by the high Turkestan Mountain Range. That region, measuring 12,000 sq km was inhabited by over 400,000 people in 1939.

The region is hemmed in by 2 mountain ranges, the high Turkestan range in the South and the low Kuramin Mountains in the North. Located between those 2 ranges, at an altitude of 300-500 m above sea level, is

the Syr Darya River Valley, which is wide at the eastern border and narrows down toward the West. Rising on both sides of the valley are sloping foothill plains, which account for the major portion of the region's territory.

The northern, or right-bank, plain is a comparatively narrow strip of land, 15 to 30 km wide, extending between the river and the foothills of the Kuramin Mountains. Further up are the waterless and treeless slopes of these mountains, which contain the richest deposits of non-ferrous and rare metals. Since no sizable rivers flow down those slopes, the right-bank plain has always been waterless and sparsely populated. The dry and pebble-covered plain, grown over with wormwood, has been used for autumn and winter cattle grazing. It was the Soviet Government which started the irrigation of large portions of that land with Syr-Darya water.

The left-bank foothill plain is more complicated. In the western part of the region it extends 60 km towards the Turkestan Mountain Range and rises to an altitude of 1,500 m above sea level. Its central part is limited by the Belesenyk Mountains to a narrow strip of 1-2 km extending along the Syr-Darya river. It grows wider again in the eastern part and covers the hilly spurs of the Belesenyk Mountain Range, which are rich in coal and oil.

The left-bank plain is well irrigated by the rivers flowing down the Turkestan Mountains. The most important of them are the Isfara, Khodzhabakyrgan, Isfana, and Aksu. Reaching the valley through their alluvial fans, they spread fanwise into numerous irrigation reservoirs. It is around these "irrigation fans" [veyery oroshaniya"] that the major part of the population has been concentrated for many years.

The climatic, soil, and vegetative conditions are different in the different parts of the region. Gradually replacing one another between the plains and mountain slopes and peaks in the following order are desert, semidesert, forest-steppe, subalpine and alpine belts. The widest among them are the desert and forest-steppe belts.

The desert belt includes the Syr-Darya River bottom land, the entire right-bank plain and part of the left-bank plain up to an altitude of about 800 m above sea level. There is very little precipitation there, about 125-150 mm (Leninabad, Isfara), and it occurs only in the winter-spring months; the summer and autumn months are dry and clear. Only irrigated agriculture is possible with such low precipitation. Oases are found only near streams and springs. The 6 month growing season, with its cumulative total temperature of at least 4,000°, is favorable for cotton raising and the cultivation of southern fruit cultures (see footnote on page 14). Large cotton-growing fields are concentrated there.

Further up, the climate becomes more humid and cooler. The desert belt is replaced by a very narrow semidesert strip which turns into a forest-steppe belt. The upper part of the left-bank plain and the slopes of the Kuramin Mountains above an altitude of 1,000 m are already in the forest-steppe climate zone. There is about 3 times as much precipitation on these slopes as in the valley (about 400 mm in Ura-Tube) and agriculture is possible without artificial irrigation. Grain and oil-bearing plants make up most of the crops. Special mention should be made of vineyards. The latter do not grow so well in the valleys as on comparatively cool slopes where the average annual temperature is more even; it is there that most of them are concentrated.

Land plots covered with green and succulent grasses during the summer are found in the upper sections of the Turkestan and the Kuramin mountain ranges. There is no permanent population there, and the land is used for summer grazing.

The best parts of this region, which was an integral part of the rich Fergana Valley and shares its history, have been thickly populated since ancient times. The trade routes between China and the countries of Europe and the Near East ran across the Fergana Valley. In this valley there were large cities with a trading and artisan population, growing agriculture and animal husbandry, and some industry engaged in processing valuable minerals.

At the time Central Asia was annexed to Russia, its feudal system was in the throes of a severe crisis. The incessant wars among the khanates disrupted all trade connections and ruined the artisans while the irrigation installations and agriculture were neglected and ore-processing was all but discontinued.

The inclusion of the Fergana Valley in the Russian territory in the second half of the past century, the construction of a railroad line and small enterprises for the primary processing of agricultural raw materials, the mining of certain types of minerals and, what is more important, the organization of commercial cotton growing contributed to some extent to the development of the productive forces of that region. The Russian capitalists strove to make Central Asia their reliable raw material base and supplier of cotton for the Moscow, Ivanovo, Lodz and other textile mills. The Fergana Valley with its warm climate, its fertile and well-irrigated land, and numerous but impoverished peasantry became the major base for the production of white gold. In 1907, for example, it produced 70% of all commercial cotton and fiber exported from Turkestan. Railroad lines were built between Krasnovodsk and Tashkent and later between Tashkent and Orenburg for the purpose of establishing closer connections between

the mother country and its colony. The first railroad to the Fergana Valley was built in 1897 and provided a strong stimulant for the development of cotton growing. Cotton became the major agricultural product of the western part of the Fergana Valley. American types of cotton were introduced in the 1880s, and since then they have been increasingly replacing the low-yield Asiatic cotton ["gura"] from year to year. The first cotton-processing plants had been built in the Khodzhent and Undzhinsk counties even before the railroad was built.

The development of the commercial type of agriculture was accompanied by an intensified exploitation and impoverization of the dekhkans (peasants), the major producers of cotton. Burdened with debts and cheated by usurers and bais, the dekhkan was forced to sell his tiny plot of land at a bargain price and work as a sharecropper on the bai's land for a very small part of the crop. The loss of land by the dekhkans reached unusual proportions. In 1908, for example, about 70% of the peasant families of Khodzhent County had no land of their own.

Cotton was not the only agricultural product, even though it accounted for the major part of the revenues. The construction of the railroad also stimulated the development of horticulture and, to some extent, also of viticulture and silkworm breeding. Apricot orchards were concentrated in the Syr-Darya Belt, replacing the vineyards which had suffered from recurring frost. The latter were moved mostly to the foothill plains. Khodzhent County alone produced almost 1/4 of all the dried fruit exported from Turkestan before the revolution; it was famous for its dried apricots and currants.

The industrial activities of Central Asia underwent certain changes after its annexation to Russia. Russian and foreign industrialists built several very simple enterprises in Khodzhent County, designed for the primary processing of agricultural raw material and for mining minerals. The most important of them were the cotton-processing plants in Khodzhent, the coal-mining enterprises of Shurab, and the oil and ozocerite (mineral wax) producing enterprises in Sel'-Rokho. The ancient handicraft industry which produced local consumer goods continued to function in the towns and kishlaks though it was greatly undermined by imported goods.

But neither the agriculture nor the large industry of Central Asia could possibly develop on anything resembling a large scale under tsarism. The production of raw materials as a whole was insignificant. For example, all the cotton plants located within the region under discussion produced a total of 630,000 t of cotton and fiber in 1913. Agricultural technique was primitive and the yields were low. Although water became scarcer as the cotton fields were expanded, very little was done to improve the irrigation system. The mineral resources were used in a limited but ruthless manner.

The favorable conditions of this region -- the dry climate and long hot summers, exceptionally rich mineral deposits, good transportation facilities, and a thick population experienced in specialized agriculture and handicraft production -- were fully utilized only under the Soviet Government.

In the overall economy of the republic, the western part of the Fergana Valley stands out as a region of intensive agriculture, devoted primarily to cotton growing, and a large industry for processing agricultural raw materials and mining minerals.

Its agriculture is highly diversified. The collective farms of the region engage in cotton growing, stock breeding, silkworm-breeding, viticulture, and in the production of such cultures as grain, oil-bearing plants, melons, etc. Fruit and grape growing and silkworm breeding are done on a large scale throughout Tadzhikistan.

The specialization of agriculture is essentially determined by the differences in the natural conditions. Disregarding details, one can distinguish 2 types of agriculture determined by the particular location, the valley and the foothill type. The valley kolkhozes plant their crops mostly on irrigated land, while the foothill collective farms use unirrigated land. There is also a difference between the types of their crops. Cotton is raised on a large scale on the irrigated valley lands. Also, concentrated in the valleys are fruit orchards. The unirrigated land of the foothill kolkhozes is planted to grain and oil-bearing cultures (flax, safflower, and sesame). Growing in the same belt are numerous large vineyards.

The area under crops in this region amounted to 190,000 ha in 1955; 3/4 of that area is planted to grain, beans, and oil-bearing cultures.

But important as all the mentioned branches of agriculture may be, cotton growing is still the major occupation of the rural population. The cotton-growing area is serviced by 13 of the region's 15 MTS. About 1/2 of all the collective farmers' workdays are used for the production of raw cotton. Finally, cotton is the major commercial product, as can be seen from the incomes derived by collective farms from the various branches of agriculture in 1953, for example (in % terms):

Cotton growing	71.8
Animal husbandry	6.4
Horticulture and viticulture	6.0

Silkworm breeding	5.2
Grain and oil-bearing cultures	3.4
Vegetable gardening	2.0
Others	5.2
TOTAL	100.0

Connected primarily with the expansion of cotton growing are all the land melioration projects carried out in the prewar period and, on a much larger scale, at present.

More than 39,000 ha of land were planted to cotton in 1955; in 1954 the average crop in Leninabad oblast was 28.7 centners of the Soviet varieties of raw cotton per hectare (Pravda, January 1, 1955).

With the expansion of the cotton-growing area, the chronic water shortage, which dates back to the prerevolutionary period, became still more acute. This stimulated the construction of 2 gigantic irrigation canals, the Large Fergana and the North Fergana. Both canals were built in 1940 by tens of thousands of collective farmers from the Uzbek and Tadzhik republics.

The Large Fergana Canal is 270 km long. It originates in the Naryn River, one of the 2 rivers (the other is Karadarya) making up the Syr-Darya River, and carries its water across the entire Fergana Valley. It extends also over 100 km in northern Tadzhikistan along the left bank of the Syr-Darya River, where it improved the water supply for the old irrigated areas and provides additional irrigation for several thousand hectares of fallow land. The North Fergana Canal extends about 30 km into the Tadzhik SSR, irrigating several thousand hectares of little-cultivated land along the right bank of the river.

The renewed expansion of the cotton industry after the great Patriotic War, prompted the republic to undertake the construction of powerful water pumping stations using the electric power of the Farkhadges Plant (The Farkhadges is a powerful hydroelectric station on the Syr-Darya River in the Uzbek SSR, built in 1942). Two Umdzhin water-pumping installations, irrigating 3,000 ha of collective farm land, were completed, and the Naus Water Pumping Station is now under construction. The collective farms are also building their own small pump houses on the banks of the Syr-Darya and the canals.

Large-scale land improvement projects are now underway on both banks of the Syr-Darya River. More than 45,000 ha of new land are to be made cultivable between 1954 and 1960 in the western part of the Fergana Valley alone. The vast stretches of land on the right bank of the Syr-Darya -- the Samgar, Yavan, and Del'verzin steppes -- will be irrigated for the first time. A dam and hydroelectric station are under construction on the Syr-Darya River. The canals to be extended to both banks from the Kairak-Kum water reservoir now under construction will provide self-flowing ["samotechnoye"] irrigation, and the powerful hydroelectric plant will supply electric power to the numerous pumping stations. The large Dal'verzin Steppe will be irrigated by the existing Farkhad Water Reservoir and with the aid of the Farkhad Hydroelectric Power Plant.

The newly irrigated land will be used mostly for cotton growing. This has already prompted the shifting of a large number of kolkhozes to the new land, mostly from the mountain districts, and the construction of new collective farms, MTS, cotton-processing plants, oil mills, and villages. The foundation has already been laid in the Dal'verzin Steppe for the construction of a center of the future rayon.

Among the other important branches of agriculture in that region are horticulture and viticulture. More than 1/2 of all the orchards and vineyards of the republic are concentrated there. The fruit orchards are concentrated in the Leninabad, Kanibadam, and Isfara oases, and about 9/10 of them produce apricots. The fruit grown in those orchards had gained world fame for their quality and taste even before the revolution. Their sugar content is about 1½-2 times as high as that of the European and American varieties. The local selection experts have preserved other valuable features of the fruit trees: resistance of the fruit to wind (which is very important in the Fergana Valley, where the winds are very strong, particularly near the "Khodzhent Gates"), the high yield and longevity of the trees. Before the revolution there was no canning industry in the region, and only dried fruit was exported. Much of the fruit is still raised for drying purposes, but a considerable part of the crops is used for supplying raw materials to the 4 canning plants built near the fruit-growing area.

As has already been mentioned, the major vineyards are concentrated in the foothill zone, mostly in the upper part of the left-bank plain. About 1/2 of the republic's vineyards are found in the Ura-Tube Administrative Rayon alone. The local inhabitants have developed excellent new kinds of grapes, especially of the kish-mish (seedless) variety: the Ura-Tube grapes were famous far beyond the borders of Central Asia

even before the revolution. But before the revolution, only the dry product, the kish-mish raisins, was available to the consumer. While grapes are still used for the production of raisins, part of the crop is also used for the production of wines and another part is exported fresh. There are 3 wine distilleries in the region.

Horticulture and viticulture are profitable industries, and in many collective farms they are leading branches of production. In 1952, for example, the orchards and vineyards of the Ura-Tube Rayon accounted for 59% of the collective farms' income. The government offers the collective and state farms all sorts of aid in the development of these branches of agriculture. The 2 fruit-and-grape state farms organized in the rayon -- Avchikalach and Isfara-Kyakan -- are to be developed into model progressive farms. Established also were 2 fruit nurseries and a base where the selection experts study the various types of fruit and grapes and turn the best varieties over to the collective farm orchards. But the orchards and vineyards are still unable to meet the growing demand of the canning and wine-making industries of the region. What is required is not only an expansion of the plantation area, but also a considerable change in the types of plants; the orchards should consist mostly of apricot trees, and the vineyards must produce grapes with a higher acid content, i.e., not exclusively for wine-making purposes. (The apricots in the entire region ripen almost at the same time and the canning plants are therefore supplied with raw materials for a short time only. The development of different varieties of the fruit that ripen at different times would facilitate more normal operations of the canning industry.)

According to income, animal husbandry ranks next to horticulture and viticulture. There were over 700,000 head of all types of cattle in the region in 1955. A large portion of the available herds consists of goats and sheep.

There are differences also in the quality and the breed of certain types of domestic animals. The sheep, the numerically largest part of the cattle herds, are mostly of the large fat-tail breed; there are no Darvaz sheep, and the Astrakhan sheep are few in number. The collective farms of the western part of the Fergana Valley, particularly of its flatland sections, have been pioneering in the development of a new breed of goats, a cross-breed of the Angora and a local goat which produces a larger amount of semifine wool. The breed now makes up a considerable part of the local herds, and it is now being developed also in the other regions of the republic. Credited with superior qualities is the local breed of Karabyr horses, which are widely used in the economy, especially in transportation. The state stud farm in Ura-Tube is now engaged in the further improvement of that breed of horses.

The maintenance of the cattle herds is largely dependent on the utilization of the natural pastures at home and in the other regions. The sheep and goats are kept on the grazing land practically all year round and provided with additional fodder over a period of 30-40 days, while the long-horned cattle is kept in sheds up to 3 months a year. Some collective farms make it a practice to keep their dairy cattle in sheds for longer periods of time. The natural fodder reserves in the western part of the Fergana valley are not as great as those of the South Tadzhik rayons. The pasture lands account for less than 20% of the region's territory, i.e., for only 220,000 ha. The summer pastures are comparatively small fields in the upper part of the Kuramin Mountain Range and on the northern slopes of the Turkestan Range, and the winter pastures, though covering a larger area along the right bank of the river, offer a meager fodder supply. The region's kolkhozes have therefore been allocated additional pastures for use at different seasons in the neighboring republics of Kirgizia, Uzbekistan, and Kazakhstan. The MTS offer much assistance to the collective farms. The collective farms throughout the region, and beyond it, have been improving the maintenance of their cattle on the pastureland. Dry areas are irrigated, fodder cultures are planted on some of the pasture lands, fodder reserves are stocked every year, winter housing is built for the cattle, and communication facilities are improved. The Kyzyl-Kum pasture lands, the farthest removed from the region, now have their own radio station.

But the exceptional possibilities for the further development of the cattle-raising industry, inherent in a highly developed agriculture and industry, are still inadequately utilized. It is possible, among other things, to raise highly profitable dairy cattle by the use of grain fodder cultures, corn, planted grasses and by-products of the food industry; the products of such dairy cattle are urgently needed by the numerous city and village population of the region.

Continuing their ancient economic traditions, the population still engages in large-scale silkworm breeding. By far the largest part of all the mulberry trees of the republic are concentrated in this region, and at least half of all the cocoons are produced here.

Silkworm breeding was practiced here on a large scale before too, but the technique used was very poor. Cocoon production was a sideline for the cotton growers, mostly of the women, and was concentrated in small primitive farms. Most of the cocoons were exported to Russia or abroad, and some of them were processed by the local artisans into national varieties of cloth.

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The large silk industry, built up after the revolution and designed to work on local raw materials, has changed the entire silkworm-breeding industry. Cocoons are now produced by large collective farms which get permanent large-scale assistance from the government. The application of the latest technological methods to silkworm breeding has produced a thorough going change in the whole complicated process of cocoon production. The graine (butterfly larva) is now processed only in special graine plants; it is revived in special incubators, not in little sacks in the house as was the case in old Khodzhent; the primitive methods of sun-drying and processing of the cocoons have been replaced by the latest facilities for killing the cocoons by steam and drying them in the shade. An important achievement in the field of silkworm breeding is the development of a new hybrid (and superior) graine and new methods of accelerated feeding, which have considerably increased the yields of the cocoons.

In 1913 the cocoons produced in each chamber [*korobka"] in Khodzhent County amounted to 23.4 kg, but after the Great Patriotic War the average cocoon yield was increased 1½-2 times. The cocoons produced in the region are no longer exported but are all processed at the large silk enterprises in Leninabad.

The development of the industry in the region was closely tied to the production of local raw materials, to the existing prerevolutionary enterprises, to the availability of local cadres, such as weavers for example, and finally, to the population's needs for various industrial manufactures.

The first years of the Soviet Government saw the restoration of the old cotton mill in Khodzhent, coal mining in Shureb, and oil-extraction in Sel'-Rokho; the construction of a small fruit-canning plant in Kostakoz, a flour mill in Ura Tube, etc. The first graine plant in the history capable of producing large quantities of high quality graine went into operation in 1919 in Khodzhent. Among the large enterprises of that time was the Khodzhent silk-winding mill Krasniy Tkach [Red Weaver]. As may be judged by the place names, the first industrial enterprises had already been fairly evenly distributed in the region, according to the availability and diversity of its raw material resources. But those were still small enterprises of a semihandicraft type using old equipment, some of it of foreign make.

In the 3 prewar five-year plans, industrial processing was extended to include practically every type of agricultural raw material. Numerous geological expeditions have discovered new deposits of highly valuable minerals which are now being exploited. New cotton-processing and fruit-canning plants and wine distilleries have been built in the past 10-12 years. Equipped with the latest Soviet-made machinery, these plants

are capable of producing larger quantities of higher-quality goods. For example, the canned apricots produced by the Leninabad Combine in 1937 were awarded the first prize at the International Exhibition in Paris.

It was at that time also that highly complex enterprises, designed for a complete cycle of operation, first came into being. Among them is the Leninabad Silk Mill Combine, one of the largest in the USSR, which went into partial production in 1932.

The newly constructed building material plants are capable of meeting the demand for building materials in the region.

The fuel base of the region was completely reconstructed. A new oil field, Nefteabad, was opened on the bank of the Isfara River and is now under exploitation; the old Sel'Rokho oil fields, renamed KIM, were mechanized and expanded, and a new mechanized coal mine went into operation in Shurab.

The valuable minerals discovered in Karamazar (polymetals and rare metals) stimulated the organization of a powerful mining industry center in the region.

Of the many factories and plants built in this region in the postwar period, mention should be made of the Kanibadam Foundry Machine Plant, which laid the foundation for the development of a machine-building industry in northern Tadzhikistan, and the Kanibadam Oil Extracting Plant.

This region accounts for about 40% of Tadzhikistan's industrial output. The most advanced industries here are canning, silk production, and polymetal processing. These branches of industry, as well as wine production and oil and coal extraction produce from 70% to 100% of the output of the related industries in the republic.

Looking at the distribution of these industries in the region, one cannot fail to notice the close proximity between most of the enterprises and their raw material sources. The mining and primary processing of minerals are concentrated in Karamazar (Kansay, Adrasman, Takeli, and Chorukh-Dairon) and in the eastern part of the Belesenyk Mountain Range (Shurab, Kim, and Hefteabad). The cotton-processing, oil producing, and canning plants are found in the lower cotton-orchard oases (Leninabad, Sovetabad, Proletarsk, Kanibadam, Mel'nikovo, and Isfara). One currant-canning plant and 2 wine distilleries (in addition to the Sovetabad Distillery) are located in the largest vineyard area of the republic (Ura-Tube).

The enterprises to which good transportation facilities and an industrious population are more important than the proximity of raw material sources are concentrated in the old thickly populated zone of the region (Leninabad, Kanibadam, and Isfara). Among them are the silk combine, the silk weaving and spinning mill, the foundry-machine plant and most of the local industrial enterprises catering to the population's needs.

The population's demands are met to some extent also by the cottage industry, which produces a large variety of goods. Maintaining to some extent its prerevolutionary tradition of craftsmanship, that industry is still located in its original centers of Leninabad, Kanibadam, Isfara, Ura-Tube, Ashte, etc.

The development of the region's economy is accompanied by a considerable increase in its population. It grew from 217,600 to 410,200 i.e., almost 100% in only 13 years (from 1926 to 1939).

Rapidly increasing also is the city population. In 1939, 27.5% of the region's population lived in cities and city-type settlements. There were only 3 cities and 9 settlements in the region at that time as against the 6 cities and 11 city-type settlements in existence now.

A new and numerous working class has come into being here. Suffice it to say that the Leninabad silk combine alone employs several dozen times as many workers than the total number of workers available in North Tadzhikistan in the prerevolutionary period.

Speaking of the economic and cultural development of the region, mention should be made also of the economic characteristics of its various parts. The bulk of the region's population lives in the well-irrigated belt on the left bank of the Syr-Darya River, which includes also the broader part of the Isfara River Valley to the East of the Belesenyk mountain range. Located in that belt are almost all the cotton-orchard-mulberry oases and cities of the region with the exception of Ura-Tube. Railroads are found in that belt alone: a trunk line crossing it from West to East and a spurtrack connecting it with Shurab and the Isfara Oasis. The prospects for irrigating the mentioned part of the region depend on the reconstruction of the Syr-Darya, its left tributaries and the Large Fergana Canal.

There are still essential differences between the eastern and western parts of the region, mostly in regard to industrial development.

Extending in the western part is the large Leninabad Oasis comprising 2/5s of all the irrigated land area of the region. It is irrigated primarily by the mountain rivers -- Khodzhabakyrgan, Isfana, and Aksu --

partly also by springs and the Large Fergana Canal, which carries its water to Khodzhabakyrgan; that canal gets its water by means of a number of pumping stations, the largest of which, Udzhin Station, gets it directly from the Syr-Darya River. The Large Fergana Canal is being expanded, and new pumping stations designed to irrigate additional large areas of that oasis are under construction.

The specialized branches of agriculture are cotton growing, stock breeding, horticulture, and silkworm breeding. In view of the lack of valuable minerals, most of the industry is designed to process local agricultural raw materials; the importance of that industry, however, extends beyond the limits of the oasis.

Among the leading industrial and cultural centers is the city of Sovetabad (near the Leninabad Railroad Station) and the city-type settlements of Proletarsk, Chkalovskiy, and Nau. In these settlements there is a canning plant, a wine distillery, a brewery, a cotton-processing plant, and a brick factory, as well as central electromechanical shops. Leninabad, the oblast capital, is the largest industrial and cultural city.

Leninabad is located at the very entrance to the Fergana Valley in a comparatively narrow passageway between the Mogoltau Mountains in the North and the Turkestan mountain spurs in the south. That place has been known for many years as the "Khodzhent Gates."

Blocking the entrance to the rich Fergana Valley from the vast Turan steppes, Khodzhent has lived through a turbulent history. It was built in ancient times. Alexander of Macedonia captured and destroyed it during his crusades (in 329-326 BC) and built a new fortress, Alexandria (Alexandria Eskhata), in the same place or next to it. Several centuries later, in 711 AD, an Arab warlord Kuteyba marched on Fergana, captured Khodzhent (at that time known as Khudzhand), and plundered it. Five centuries later, in 1220, the city fell under the blows of the Mongolian legions, who not only destroyed it, but also exterminated its population.

In certain periods of history Khodzhent was a large handicraft industrial and political center. For example, this was the case at the turn of the second millennium when the city had a large number of artisans' and tradesmen's quarters. The Karamazar mines, containing silver, copper, and lead deposits, were under intensive exploitation at that time. The ore was processed in the city. Important trade routes ran through Khodzhent, but the Mongol invasion hampered its development. The next period of the city's prosperity was between the fourteenth and fifteenth centuries when new artisans' and tradesmen's centers sprang up in the city.

At the beginning of the nineteenth century Khodzhent became part of the Kokand khanate which was organized at that time in the Fergana Valley. The Bokhara and Kokand khanates were always at war, and Khodzhent, the key to the Fergana Valley, frequently changed hands and suffered destruction. In 1866 it was annexed to Russia.

As part of Russia's possessions, Khodzhent systematically increased its population. Thus its population grew from about 18,000 in 1872 to about 35,000 in 1903 and to about 40,000 in the prerevolutionary period. The Russian industrialists built several handicraft enterprises in the city for the primary processing of raw materials: cotton mills, fruit processing plants, leather factories, and brick factories. These enterprises employed about 200 workers. The city remained as a large artisan and handicraft industry center of a large agricultural region. A large part of its population engaged in fruit growing, silkworm breeding, and cotton raising. Cotton fiber, dried fruit, and raw silk were the major commodities exported from the city and its surrounding rayons. The cultural level of the city was very low. In 1910 it had one single-grade parish school and a Russian-native school, both of them attended by a total of 70 students.

The rapid economic and cultural development of Khodzhent did not start until after the October Socialist Revolution. In 1929, the Khodzhent Okrug, theretofore part of Uzbekistan, was reunited with the newly formed Tadzhik SSR.

As the largest city in northern Tadzhikistan, Khodzhent came in for special attention. Its geographical situation was exceptionally favorable. The city is located in the center of a vast silk-cotton-fruit growing oasis which serves to determine the direction of its economic development. Running alongside it is a railroad trunk line. A mining industry is under development in the Kuramin mountain district North of Khodzhent; South of it, in the supper part of the left-bank plain, is a large area of unirrigated crop lands and vineyards. There are good automobile highways connecting the city with these rayons. Khodzhent is now undergoing rapid economic and cultural development.

The streets were replanned, paved, and lined with trees in the thirties. A pontoon bridge was built across the Syr-Darya, a new city water-supply system was put into operation, and bus communication was inaugurated between the city and the railroad station 12 km away.

In 1936 Khodzhent was renamed Leninabad, and the Khodzhentskiy Rayon changed to Leninabadskiy Rayon.

Numerous enterprises went into operation in Leninabad and its outskirts before the great Patriotic War. They were designed to fit into the pattern of agricultural production of the surrounding area and to meet the internal demands of the city and the outlying districts.

Over 1/4 of all the large oblast enterprises are now concentrated in Leninabad, and they play almost as great an economic part in northern Tadzhikistan as does Stalinabad in southern Tadzhikistan.

In addition to its economic importance, Leninabad is also developing into one of the largest cultural centers of the young republic. Just like Stalinabad, it is a center for training qualified cadres for the rapidly developing agriculture, industry, trade, culture, and public health service. It has the largest teachers college in the republic. Agricultural specialists are trained in the agricultural technicum and the school for mechanization specialists. A mining technicum, the first in Tadzhikistan, was opened to train workers for the mining industry. There is also a cooperative trade technicum and a medical school. The school for music, which was opened almost a quarter of a century ago, played an important part in the training of national musicians for the entire republic. The theatre of musical drama imeni A. S. Pushkin, has been functioning in Leninabad since 1932. On its stage appear the republic's national and honored art workers whom it has trained. The city also has an interesting regional museum, a house of culture, a house of pioneers, schools, libraries, cinemas, and clubs, and it publishes its own newspapers. Such are the principal results of the 30 years of cultural construction of one of the most ancient cities in the world now under Soviet rule. Leninabad is the second largest cultural center of the republic next to Stalinabad.

The city extends from West to East along the Syr-Darya for over 4 km. In the west, the city blocks abut against the bank of the river, which makes a sharp turn there; in the south, flanked by the city buildings on one side and the unirrigated pebble-surfaced Digmay elevation on the other, is a wide belt of orchards and fields. City buildings are now under construction in this former suburb. There is much space for the further expansion of the city in the Southeast in the direction of the young city of Sovetabad (formerly Ispisar). It is a 12 km stretch of former wasteland, which is now crossed by a railroad spurtrack and is the center of intensive construction -- mostly industrial enterprise construction.

The city is built on a thick stratum of pebbles deposited by both the Syr-Darya, which is receding to the North, and the Khodzhabakyrgan River, which leaves its alluvial fans on the terraces. Some parts of the pebble stratum are 4-5 m thick. The city territory inclines toward

the Syr-Darya from 380 to 320 m of absolute altitude, and that has a certain effect on its water supply. The upper part of the city is well supplied with water from the adjacent Khodzhabakyrgan River, while its lower part has little water. It is available in the irrigation ditches only when the orchards are watered. The main source of water supply there is the water fed through the ducts originating in the Syr-Darya River above Leninabad. Wherever water-supply pipes have not been installed, use is made of the local "khauzy" (ponds) containing fairly good ground water.

The beautification of the city with trees and shrubbery is closely connected with the nature of the water supply. A beautiful green landscape covered with gardens and parks can be seen from the upper part of the city, which rises up on an alluvial fan. Growing between those trees are melon cultures, cotton, and lucerne. This peripheral land is now under housing construction. The verdure in the lower part of the city is still meager due to the lack of water. Trees and shrubbery are rare even along the principal avenues of the city which can in no way be compared to the green streets of Stalinabad.

Leninabad is different from Stalinabad in yet another respect. Unlike Stalinabad, which was built under the Soviet Government on barren land, Leninabad has grown from an old town of artisans and tradesmen with its narrow, zigzagging, and dusty streets, adobe huts, ponds, and market places and cemeteries in the center of the city, etc. But these old features are rapidly disappearing: the city is now criss-crossed by straight and wide asphalted streets and squares and is filled with an increasing number of new tall and beautiful buildings -- enterprises, schools, institutions, theatres, stores, and multistoried apartment buildings. A large well-planned park of culture and rest was built near the old citadel on the Syr-Darya River bank. Modern workers settlements sprang up in the city's outskirts. Thus the settlement around the silk combine, for example, consists mostly of 2-story houses, has wide tree-lined streets paved sidewalks and a park. It also has a club, a hotel, a polyclinic, a hospital, schools, and children's institutions.

To the East of the Leninabad Oasis there are 2 other large oases, the Kanibadam and the Isfara. The Kanibadam covers the left bank of the Syr-Darya River, and the Isfara the wider part of the Isfara River Valley. They are separated by the hill-spurs of the Belesenyk Mountain Range but comprise a single area irrigated by the Isfara River. When the Kairak-Kum Water Reservoir is made available for irrigating part of the Kanibadam Oasis, additional water will be available in the Isfara River for irrigating new areas of the Isfara Oasis.

The agriculture of these 2 oases is not much different from that of the Leninabad Oasis, except for horticulture, which gets a little more attention in Isfara. The real difference, however, is that these 2 oases contain coal and oil deposits along their peripheries; that is why their industries which process local agricultural raw materials, are paralleled by a growing mining industry.

The Kanibadam Oasis industry is concentrating in the rapidly growing city of Kanibadam. The city has good communications, situated as it is near the junction of the railroad spurtrack to Shurab. An artisan village considerably smaller than Khodzhent before the revolution, Kanibadam is now a large industrial center with its canning, cotton-processing, oil manufacturing, foundry-machine plants, and a large cotton-spinning mill.

In Kanibadam, as in Leninabad, the industrial enterprises are located along the city's outskirts. Each enterprise has its own workers settlement with modern houses, tree-lined streets, power plants, schools, and various institutions.

The industry of the Isfara Oasis is also concentrated in a single center, in the city of Isfara. The Isfara Oasis is one of the largest fruit-growing areas in all of Tadzhikistan. Indeed, the broad valley, extending 20 km to the East of the Isfara River and irrigated by it, looks like one big apricot orchard.

The city of Isfara was built on both sides of the swiftly flowing Isfara River and near the railroad spurtrack running from Kanibadam to Shurab. It was a large ancient orchard-village transformed into a city which is now expanding into a large industrial center. Its canning plants, building and binding material plants, and distilleries mostly use local raw materials. Surrounded by mountains, buried in gardens, and irrigated by a mountain river -- all of which make the summer temperature milder -- the city of Isfara is one of the most attractive and healthful spots of Central Asia. Sanatoriums, rest homes, and pioneer camps could be established in that city and in its outlying picturesque mountain gorges.

There are growing coal and oil industries outside the territorial limits of the oases.

Shurab, the coal bin of the republic, lies in the dry mountains Southwest of Isfara. The poorly equipped prerevolutionary mines and the impoverished mining population, cut off from the rest of the world, have been transformed into a large center with a highly mechanized coal-mining industry, modern transportation, and a well-built town under rayon jurisdiction with schools and cultural institutions.

North of Shurab, in similarly dry mountains, are the KIM oil fields. The entire oil-extraction process there is mechanized; automatic derricks draw the oil out of the wells and feed it into pipes, thus making human labor practically unnecessary. Two kilometers from the KIM settlement there is an ozocerite (mineral wax) mine and a plant which processes that mineral.

East of there, on the Isfara River bank and the railroad spurtrack, is Neftsabad, the second oil industry of the republic. There, too, oil extraction is mechanized. The Neftsabad settlement is well supplied with water and buried in apricot gardens.

An entirely different landscape and, to some extent, different economic characteristics are observable in the right-bank area; it consists of the large sandy Kairak-Kum Massif, a broad detritus-covered plain crisscrossed by the dry Akchop, Akbel', and Supetau hill chains with the steep, rocky, and treeless slopes of the Kuramin Mountains towering above all of them. Kishlaks (native villages) clustered around freshwater springs on the pebble-covered flatland are scattered over a distance of tens of kilometers. The largest oasis is in the eastern part of the right-bank plain along the North Fergana Canal. Large irrigated fields and kishlaks, including the rayon center Asht, are found near the foot of the Kuramin Mountain Range at the entrances to the mountain gorges and on the little rivers, which usually dry up as soon as they flow out of those gorges. Cotton, fruit, and grapes are grown on the irrigated fields. Cattle is also raised there, mostly the angora breed of goats. Because they can get along on less than the other animals, these goats thrive under the local conditions.

As has already been pointed out, the greatest riches to be found in the right-bank area -- minerals -- are concentrated in Karamazar. The Akchop and other low-mountain ranges contain salt deposits, which are now exploited at the northeastern end of the Supetau Range, in the little town of Karaken. Not far from there is the small Oksukom salt-and-mud lake and a famous mud-cure resort.

The irrigation projects now under construction on the Syr-Darya River will open vast opportunities for the development of agriculture and industry in that part of the region. The irrigation of the Samgara and Del'verzin steppes, the Khodzhabakyrgan Massif, and the land along the North Fergana Canal will add another 30,000 ha of arable land in the next few years. Contingent on that is the present construction of cotton-processing and fruit-canning plants, a railroad line to the Del'versin Steppe, machine-tractor stations, and new towns, as well as a considerable increase in the population.

The western part of the left-bank foothill plain is distinguished by its characteristic natural and economic features. Sloping high above sea level -- and therefore also cooler and more moistened by atmospheric precipitation -- this unirrigated area is planted primarily to grain and oil-bearing cultures and accounts for almost 1/5 of the whole area in the republic producing these cultures. Also concentrated there are the largest vineyards in Tadzhikistan.

In the central part of this plain, 48 km from the railroad and far from the Leninabad oasis cities, is the expanding city of Ura-Tube, an industrial and cultural center. Among its enterprises, which use the abundant local raw materials, are a flour mill, a large wine distillery which produces the widest assortment of wines in Tadzhikistan, and a currant-canning plant. There are also some local industrial enterprises. The city has a boarding school, a 3 year agricultural school, and a number of cultural institutions. Another wine distillery was built not far from Ura-Tube, in the Ganchi Kishlak. Large quantities of agricultural raw materials -- grain, fresh grapes and fruit, cocoons, and animal products -- are also shipped from here to the Leninabad Oasis plants and to the Ursatyevskaya Railroad Station for export purposes.

The upper part of the plain, including the city of Ura-Tube is characterized by excellent climatic conditions. The summers are not hot and the air is clear, and the good water and abundance of grapes make this a favorite rest-cure spot. A hospital for the treatment of lung patients with mare's milk is open every summer near the Shakhristan rayon center.

A good but winding automobile highway runs up the slope of the Turkestan Mountain Range, through the Shakhristan Pass (3,351 m) and down into the Zeravshan Valley.

The Zeravshan Valley

The high-altitude Zeravshan Valley extends almost 300 km from West to East within the republic. Its area of 12,600 sq km was populated by about 103,000 people in 1939.

This region is bordered by the Turkestan Mountain Range in the North and the Gissar Mountains in the South. Running between these 2 ranges, and parallel to them, is a third range, the Zeravshan. The 3 mountain ranges are very high, 4,000 m and higher in the east and about 3,000 m in the west. The Turkestan and Gissar ranges are divides, i.e., is they are not crossed by rivers, whereas a number of gorges cut up the Zeravshan into separate ridges.

Flowing between the Turkestan and Zeravshan mountain ranges, the large Zeravshan River is joined by 3 large tributaries and about 100 streams. Its large tributaries -- the Fandarya, the Kshtutdarya, and the Magiandar'ya -- originate in the Gissar Mountains, flow into the Zeravshan River, and cut across the Zeravshan Mountain Range through deep canyons.

The Zeravshan Valley is the largest and most densely populated area in this region. Broad as its western end and narrowing down toward the East, it rises in this direction from 900 m to 2,500 m above sea level. Working its way deeper into the bottom of the valley, the Zeravshan has left a number of terraces, the oldest of which is about 600 m above the river's present water level. The terraces found on both banks of the river contain kishlaks, plowed fields, and orchards. Some of the best-preserved parts of the terraces are 1.5 km wide. These contain the largest villages and highways, but in some places the valley becomes narrow and the terraces disappear. There the kishlaks and orchards are found on terraced slopes and the roads wind through the rocks or are strung across artificially leveled places. West of Kshtutdarya the valley becomes wider and gradually turns into a flat steppe through which the Zeravshan River flows between low banks and branches off into several channels. The terraces are followed by small foothill plains extending up the mountains, which are somewhat lower there.

One part of the population lives in the mountain gorges formed by the large Zeravshan tributaries, and another part in the gorges and valleys formed by those tributaries' own tributaries. The most populated of these is the high-altitude valley along the upper reaches of the Yagnob River (a tributary of the Fandarya River) which flows between the Zeravshan and Gissar mountain ranges at an altitude of 3,000 m above sea level.

It is difficult to describe the climatic characteristics of the Zeravshan Valley in view of its mosaic structure. On the whole, it is characterized by a gradual change from the hot climate of the lower plains to the cold climate of the high altitudes. The climate of the lower western part of the valley is of the semidesert type, with a long growing season and a warm summer (the average July temperature is above 26°). The air becomes cooler with increasing altitude. In the central part of the valley, at 1,500 m above sea level, the average July temperature is 24°, and in the eastern part, which is 2,500 m above sea level, the temperature is 15°. There is little precipitation at the bottom of the valley (180-330 mm per year), but more on the mountain slopes. Most of the moisture is concentrated in the narrowest and highest eastern part of the valley containing the huge Zeravshan Glacier.

which is 25 km long and is the source of the Matcha River (this is the name of the upper section of Zeravshan). Shielded from the cold northern winds by the high Turkestan mountain range, this valley is warm even at comparatively high altitudes. Thus southern grades of tobacco, rice, and grapes are raised in the western part of the valley; fruit, particularly apricots, grow in the central part, and grain, vegetables and an extra large and high-yielding grade of potatoes in the eastern part.

More rigorous climatic conditions obtain in the high-altitude lateral valleys, especially in the Yagnob Valley. The arborial vegetation up there is sparse, and grain is the major agricultural product raised.

The Zeravshan Valley has been inhabited by Tadzhiks since ancient times. The various conquerors of the past were more interested in the large oases on the plains than in this region, in view of its inaccessibility and it therefore remained isolated from the rest of the world. The survivals of the past socioeconomic orders, customs, language, and culture are more widespread there than in other places. The inhabitants of the Yagnob River Valley, for example, still use certain expressions of the Sogdian language, which went out of use in the valley a thousand years ago.

Before Central Asia was annexed to Russia, the Zeravshan Valley consisted of 4 bekdoms and was part of the Bokhara khanate. Economically it was an exceptionally backward region with a poor population and a seminatural economy. The situation was further aggravated by the fact that the autocratic beks were frequently at war with each other, plundering and oppressing the population.

The annexation to Russia in 1870 and the free communication with Russian Turkestan stimulated the development of commercial agriculture in the valley, especially horticulture. The local dried apricots became famous for their quality and were marketable in the cities of central Asia.

The multifarious economic development of this high-altitude region began after the October Revolution. In 1934 the valley was crossed by an automobile road connecting Ura-Tube and Stalinabad and running through 2 mountain passes, each over 3,000 m in altitude. In the Fanak Mountain Gorge, that road replaces the old winding footpaths along the edge of the precipice and the rickety improvised crossings ("ovringi"). The second automobile road runs parallel to the Zeravshan River, across the entire valley, between Pendzhikent and Matcha.

The new roads made it possible to undertake the exploitation of the minerals found at theretofore inaccessible altitudes. Rare metals are now mined there. The most important of the nonmetallic minerals are the

hard-coal deposits in the valleys of the Zeravshan tributaries: the Fandarya (with the Yagnob), the Kshtutdarya, and the Magiandarya. The Ravat (Fan-Yagnob) deposits, the largest reserve of high-quality coal, is located near the automobile highway, but the processing of that coal requires the construction of a rail line there.

The predominant type of economy in the valley is agriculture, its leading branches being sheep breeding and the growing of grain and oleagenous cultures. These branches are the principal sources of income for the collective farms. There were over 60,000 ha of land under cultivation in the entire region in 1955; 80% of that land was planted to grain and bean cultures, mostly wheat and barley, and 10% to oleagenous cultures, mostly curly flax ["len-kudryash"]. There are about 300,000 head of all types of cattle in the region with a predominance (over 80%) of the local breed of sheep and goats. The cattle population here is greater than in the other districts of Tadzhikistan.

The nature of the economic activities in the different districts of the region is determined by the differences in the natural conditions. In the lower part of the valley, for example, tobacco growing, viticulture, horticulture, and silkworm breeding are being developed in addition to the above-mentioned branches of agriculture.

Economically, the most developed and promising part of the region is the wide and warm western part of the valley. It contains 70% of all the crop land in the region and all the vineyards and tobacco and rice fields. The wide terraces of the Zeravshan River, connecting with the rising foothill plains, can be cultivated by agricultural machinery. MTS are in operation in Pendzhikent and Gazar.

Here and there one finds considerable land massifs that can be irrigated by the tributaries of the Zeravshan River. Thus the vast Margidar Steppe and the Dashtimoli Plateau are located between its left tributaries and the Kshtutdarya and Magiandarya Rivers. The decision adopted by the Council of Ministers USSR and the Central Committee CPSU on the development of cotton growing in the Tadzhik SSR in 1954-1960 calls for the irrigation of over 3,000 ha of the Margidar steppe as the first step in that direction. (The construction connected with the irrigation of the first part of the Margidar Steppe is now under way. The total land to be irrigated in the Mardigar Steppe and the adjacent Dashtimoli Plateau, partly with the aid of machinery and partly by diverting some of the Kshtutdarya water, will exceed 6,000 ha.) Part of that land will be used for planting early varieties of cotton.

An industry for processing agricultural raw materials is so far available only in this part of the region; a wine distillery and a rice-polishing plant are in operation in Pendzhikent. An industrial combine and industrial artels are catering to the needs of the population.

Pendzhikent is the largest inhabited point of the Zeravshan Valley; it had 9,000 inhabitants in 1939 and in 1953 it was reorganized into a town under direct rayon jurisdiction. This town has a pedagogical school. A Sogdian-Tadzhik archeological expedition has been at work in Pendzhikent for several years, excavating and studying the buildings of ancient Pendzhikent. The expedition's findings serve to shed additional light on the culture of the Sogdians, the ancestors of the Tadzhik people.

Horticulture, mostly apricot growing, is widespread in the narrow central part of the valley. High-quality home-dried apricots are shipped from there to the Samarkand Railroad.

There is little land in this part of the valley. Scattered sections of the usable land are cultivated with draft animals and manually. The irrigated land sections containing crops, orchards, and kishlaks are located on the terraces and alluvial fans on the bottom of the valley. But these land sections are not irrigated by the Zeravshan River, which flows by swiftly in deep gorges, but by the numerous creeks and streams flowing down the steep mountains slopes and forming waterfalls in some places. The collective farmers make good use of that water by skillfully diverting it to the terraces so that in most cases it does not even reach the Zeravshan River. The irrigation ditches are often dug high in the gorge, several kilometers from the terrace; the water flows through the ditches along steep slopes and through wooden troughs laid across ravines or attached to precipitous cliffs until it reaches the terrace where it is used for the crops or orchards. Even the pebble-covered terraces can be cultivated when water is diverted to them; and although the large stones are cleared from the ground, it appears as if the fruit trees are growing out of the pebble, not from the soil.

Different use is made of the mountain slopes forming the valley: scattered across them are small parcels of land planted to grain and oil-bearing cultures, which are kept moist by precipitation. From time to time the inhabitants come up there for short periods to do field work.

Stock breeding and grain production are the principal economic activities in the eastern part of the valley and other high places where the climate is cooler.

The further economic development of the Zeravshan Valley is connected with the construction of a connecting railroad line and the utilization of the largest coal deposits of Central Asia and the enormous power potential of its rivers. In the lower part of the valley, further development will be facilitated by the expansion of the irrigated land for the raising of industrial crops.

The Gissar Valley

The Gissar Valley and its adjoining mountain slopes embrace the northwestern group of administrative rayons that are under the jurisdiction of the republic. In the north this economic region is bounded by the Gissar mountain peaks, in the West it borders on the Uzbek SSR, and in the South and East on a group of other rayons under the jurisdiction of the republic. That area of about 11,300 sq km was inhabited by approximately 380,000 people in 1939.

The Gissar Valley is a vast intermountain depression near the southern end of the Gissar Mountain Range at 700-1,000 m above sea level. It is 70 km long, up to 20 km wide at its central part, and 2 to 3 km wide at the ends. In the West, beyond a small watershed, it becomes the Surkhandarya Valley, the upper section of which belongs to Tadzhikistan. The total length of both valleys within Tadzhik territory is 110-115 km. In the North the Gissar Valley is blocked by the high Gissar Mountain Range, which shields it from the cold northern winds, and in the South by a small mountain chain which offers partial protection from the dry southern winds. Only the wide and open entrance in the West makes the valley accessible to the warm and comparatively humid winds. The long and flat slope of the Gissar Mountain Range rises above the valley in the shape of a row of gigantic steps broken up by deep, well irrigated and densely populated mountain gorges. The southern edge of the valley, on the other hand, is steep, waterless, less broken up, and almost uninhabited.

The Gissar Valley is irrigated by the Kafirnigan River, and the upper part of the Surkhan Valley by the Karatag River. On their right side, both rivers are joined by a number of tributaries flowing down the Gissar Mountain Range. The Kafirnigan River's large tributaries in the valley are Varzob and Khanaka, both of them of glacier and snow origin and therefore well-suited for cotton-field irrigation.

The climate in the Gissar Valley is of the dry-steppe continental type, characterized by long and hot summers with little precipitation, and short, comparatively cold, and humid winters. The average July temperature in Stalinabad (at 822 m absolute altitude) is 28°. Summer temperatures sometimes exceed 40° in the shade, but the evenings are cool even after hot days. The average January temperature is close to 0° but may

occasionally go down to 20-25° below. The average annual precipitation is 600 mm and most of it occurs during the winter-spring period. In the summer and autumn there not a single rain drop may fall on the hot and dry land for several months in a row. Wherever the land is not artificially irrigated, all the grasses dry up, and only the shrubbery remains. Growing well on the irrigated land, on the other hand, are such warmth-loving cultures as cotton, rice, tobacco, geranium, the Kazanlyk Rose, grapes, figs, pomegranates, etc. The mountain slopes retain the humidity of the prevailing, southwestern air currents, and in some of the places there is a great deal of precipitation. In Khodzhi-Obigarm, for example (at 1,700 m absolute altitude), the precipitation is close to 1,400 mm. That is why the following cultures can and do grow well without irrigation in a wide belt at about 1,200 to 2,000 m above sea level: grain cultures, broad-leaf forests of ash trees, maple, poplars, hackberry, hawthorn, and a variety of fruit trees, particularly Greek walnuts. There is still much precipitation above the forest belt, but insufficient warmth for the trees, and the only vegetation there are subalpine and alpine grass varieties. The summer pastures in the Gissar Mountains are among the best in the republic.

Before the October Revolution, southern Tadzhikistan was the remotest and most backward part of the Bokhara khanate. It had no industry, local demands were met by the cottage industry and the little cotton that was raised was consumed locally. The major occupation of the valley population were grain growing and stock breeding. Most of the arable land was concentrated in the hands of the emir, the Church, and a small rich clique of people. The dekhkan (peasant) lived in semistarvation as he worked on rented land, usually for 1/4 of the crop. Agriculture was deteriorating. The crop lands continued to shrink (by more than 1½ times between 1908 and 1914), irrigation installations deteriorated, and large stretches of land turned into marshes.

The region was ruined still further by the civil war, which lasted several years in eastern Bokhara. By 1924 the total arable land was reduced to only 1/5 of the 1917 area, and the population was reduced to 1/2. The large bazaar and artisan kishlaks (native villages) were depopulated.

The victory of the Soviet Government was followed by the restoration and development of the national economy in every district of southern Tadzhikistan, but the volume and rates of development varied with the different districts. The economy of the Gissar Valley, with its favorable geographic location, underwent a particularly speedy development. A low and open valley in the extreme West, it serves as a wide gate which connects all of southern Tadzhikistan with the railroad network of the Union. The railroad that connected Stalinabad and Termez in 1929 provided a powerful stimulant for the development of industry and agriculture in the Gissar Valley and, consequently, also in the other districts.

Agriculture grew rapidly and its production trend underwent a change: grain growing for consumption purposes gave way to commercial grain production, with technical cultures playing an important part in the process.

When the national-territorial boundaries were fixed (in 1924), total arable land of the Gissar Valley amounted to 76,000 ha of which only 2,500 ha had been planted to cotton. The total cultivable area has now been increased to 197,000 ha and the area planted to cotton to 38,000 ha. The Gissar Valley is leading in the production of raw cotton, its output amounting to about 1/3 of all the cotton picked in the republic. The rapid intensification of agriculture was facilitated by a rapid increase in both the population (in 1939 the density of the rural population in the cotton growing districts ranged from 26 to 76 people per square mile) and the enormous funds invested by the Soviet Government in the development of cotton growing. The Large Gissar Canal was built as soon as the expanding cotton fields brought about a water shortage in some parts of the valley. Measuring 49 km in length, this canal diverts some of the water of the Dushambe River to the Karatag River, irrigating several thousand hectares of land between them. There are 15 MTS in operation in the valley (1/4 of all the MTS in the republic) and 3 cotton-processing plants. An important part in the development of cotton growing in the valley is played by the Regar Cotton-Seed Testing Station, the kolkhoz seed-selection fields, and the Stalinabad Sovkhoz, a large and well-equipped state farm. These engage in improving the prevailing varieties of cotton in the valley and developing new ones and devising new agro-technical measures for cotton growing and grass planting. In 1955, the Gissar Valley kolkhozes obtained an average of 34.4 centners of Soviet-grade raw cotton per hectare. Cotton growing now accounts for 80% to 90% of all the financial income of the kolkhozes in the cotton-growing rayons of the valley.

The Gissar Valley has become one of the regions producing volatile oil cultures. Hundreds of hectares of irrigated land in its western part are planted to geraniums. The Efironos State Farm and an experimental station for oil-bearing cultures were opened in Pakhtaabad. Experiments are being conducted with such valuable volatile oil cultures as lavender, basil, lemon eucalyptus, lemon wormwood, etc, in addition to geranium, which is the principal culture. The green mass of geranium is processed into oil at the Pakhtaabad Geranium Plant.

Potatoes, vegetables and melon cultures play an important part in the food supply for the population of the towns and villages, particularly Stalinabad. This branch of agriculture has been lagging behind for a very long time. But it is now getting more attention. Large fields have been planted to potatoes and vegetables, and hot houses are under construction. However, there is still a shortage of raw materials for the vegetable canning industry and succulent fodder for the dairy cattle.

But the rapid expansion of irrigated agricultural land, which is planted mostly to technical cultures, did not reduce the importance of grain and oil-bearing cultures, which have merely been shifted from the irrigated land to the newly cultivated unirrigated areas. The Gissar Valley with its surrounding foothill plains and mountain slopes is one of the "bread grain" districts producing 1/4 of the total grain crop of the republic. It produces primarily wheat, barley, and oil-bearing flax (zigir'). Most of the crop land is found in the hill belt (adyr) where the flat hill slopes are largely ploughed up. The modern machinery of the MTS is used on that land.

Before the revolution, horticulture and viticulture in the Gissar Valley were of no commercial value despite the exceptionally favorable natural conditions for those cultures in the valley. First-grade fruit- and grape state farms have now been built in the central part of the valley. The grape growers of the Shakhrinau State Farm, for example, for a number of years have been raising the richest grape crops in the republic, and were therefore granted the privilege to participate in the All-Union Agricultural Exhibition for the third time. Working jointly with the collective farms, they have kept the Gissar Valley wine distillery and fruit-canning plant, the only ones of their kind in southern Tadzhikistan so far, supplied with raw materials. But in the development of horticulture and viticulture, this region as a whole is still far behind the western part of the Fergana Valley, inasmuch as it only accounts for 13%-15% of all the orchards and vineyards of the republic.

As regards profit, animal husbandry is second only to cotton growing. In 1955, there were about 700,000 head of all types of cattle in the valley. The Gissar Valley is situated between the vast winter pastures of the southern part of the republic and the rich summer pastures of the southern slopes of the Gissar mountain range. The proper utilization of these pastures facilited the development of the famous Gissar breed of sheep. The old routes of shifting the cattle between pastures are still in use, but the grazing conditions have been considerably improved. The Gissar breed of sheep predominates the flocks. About half of the Gissar sheep of the republic are concentrated in this valley. Also found in this region are most of the Lokay breed of horses; this breed is undergoing further improvement at the Koktash State Stables. The Gissar Valley with its well-developed vegetable and grain growing economy and food industry is also very suitable for hog breeding and dairy cattle raising. The productivity of the cows and the total income derived from cattle raising have been sharply increased in the commercial dairy farms (some of them mechanized), organized by some of the suburban kolkhozes.

The abundance of agricultural raw materials made the industrial development of the Gissar Valley possible. Enterprises engaging in cotton processing, flour milling, meat packing, silk winding, and leather making

were built one after another. At the same time, the available mineral raw materials stimulated the construction of plants for the production of building materials required by the economy. Construction was progressing at a very rapid pace. Two-to-three new enterprises were commissioned every year. In the first 2 five-year plans new plants and factories were built only in Stalinabad. The Ordzhonikidzeabad Flour Milling Combine was the only large enterprise built outside of the capital. Such a concentration of production in one place was largely due to the fact that the Gissar Valley, unlike Khodzhent and Kanibadam in the North, had no reserve of artisans and qualified craftsmen. Nor is it as rich in minerals as are the Isfara and Karamazar rayons. The Gissar Valley primarily produced agricultural raw materials, and Stalinabad alone was able to absorb and process all of it.

Substantial changes in the structure and distribution of the industry were introduced in the third, and especially the fourth, five-year plan. Good transportation connections had by that time already been established between the Gissar Valley and the other regions of Tadzhikistan. In addition to the railroad trunk line to the eastern part of the valley (Ordzhonikidzeabad), good roads were built from Stalinabad in all directions. An asphalt-covered highway, 110 km long, was extended into the Vakhsh Valley, and a narrow-gauge railroad line was built parallel to it. An automobile highway was built northward to the Varzob Mountain Gorge and, through it, into the Zeravshan and Fergana Valleys. The big Pamir Highway was built across the Karategin, Darvaz, and Badakhshan mountain district, which previously had been almost inaccessible. Heavy automobile traffic was inaugurated between the Gissar Valley and southeastern Tadzhikistan (formerly Kulyab Oblast).

The growing stocks of raw materials, produced locally and brought in from other districts, stimulated the construction of industrial enterprises also in other parts of the valley. The majority of factories and plants, however, are still concentrated in Stalinabad, which therefore reflects the principal industrial specialization of a large economic region. Stalinabad is also the largest political and cultural center of Tadzhikistan.

Stalinabad is located in the eastern part of the Gissar Valley where the Varzob River flows out of the mountains and forms its alluvial fan. (The lower part of the Varzob River at Stalinabad and below is called the Dushambinka). It is one of the young cities of the Soviet Union. Three kishlaks existed in the recent past where Stalinabad is now; one of them, Dushambe, consisted of several dozen clay huts and nomad tents and the other 2 were still smaller. In 1924 Dushambe became the center of the Tadzhik ASSR, and in 1925 it was proclaimed a city even though it was not yet a city. The construction of a city had only begun. The first

industrial combine, employing 14 workers, started operations in Dushambe in 1926. The first train arrived in Dushambe in the autumn of 1929 and stopped in the open steppe. It was still difficult to judge the outlines of the future city by the work going on at that time. Frames of new buildings and construction projects were springing up simultaneously in the East, South, and North Dushambe rayons. In 1929 Dushambe was renamed Stalinabad. Thus the foundation for the republic's capital was laid in an empty field, but in the center of the future roads of the still backward agrarian district.

Many newcomers from every part of the Soviet Union at that time became permanent residents of the young capital. The Stalinabad population grew by leaps and bounds. The city had 5,600 people in 1926; 16,000 in 1928; 24,000 in 1930; and 82,600 in 1939. It now has 191,000 residents (as of the beginning of 1956). The swift growth of the city and its urgent need for outside specialists account for the multinational character of its population. In 1939 Russians made up the bulk of the population (57%), followed by Tadzhiks (12.1%), and Uzbeks (9%), and also by Tatars, Kazakhs, Kirgizians, etc. With the training of national cadres, the relative number of Tadzhiks has now been considerably increased.

Stalinabad's industry was originally connected with agricultural production. A cotton processing plant, a flour mill, a meat packing combine, a silk mill, and a tannery had been built in the first 10 years of the city's existence. But the rapid growth of the city population, the increase in the number of workers, employees, and students created a demand for manufactured products designed to meet the daily needs of the population, and such enterprises as a lemonade plant, clothing and shoe factories, a mechanized bread-baking plant, a brewery, etc, came into existence one after another. The search for building raw materials around the expanding capital proved successful. Brick, alabaster, asphalt-concrete, and cement plants were built North of the city where fire clay, lime, and marl had been discovered.

Later, in the second and third five-year plans, it became possible to build more complicated enterprises which used semimanufactures as their raw materials. A silk-weaving mill was built before the war and a large textile combine, the largest cotton producing combine in Tadzhikistan, during the war. It was no coincidence that the combine was built in the southern part of the country, in the Gissar Valley, which is a leading cotton growing area and the concentration point for the cotton fiber of all the southern plants. (Cotton fiber is shipped to the Gissar Valley from 6 cotton processing plants in southern Tadzhikistan, some of it to be transshipped by rail and some for use by the textile combine.) Situated at the juncture of the road where that raw material inevitably concentrates, Stalinabad was picked as the site for the combine. The

Stalinabad combine is second only to the Leninabad Silk Combine as regards the number of employees. A well-built textile workers settlement with large houses and cottages, cinemas and polyclinics, schools and libraries sprang up around the combine at the southern fringe of Stalinabad. Another part of the textile combine is now under construction, and its capacity will be double that of the existing combine.

The growing industry needed more power and the city needed electric lighting. The shortage of local fuel and the high cost of imported fuel led to the only other large source of energy for the city, the Varzob River. The problem of supplying Stalinabad with electric power at that stage of its development was solved with the construction of the 7,500 kw Upper Varzob State Power Plant in 1937.

The capital continued to grow, demanding more electric power. The Lower Varzob State Power Plant, built in 1949, had twice the capacity of the first plant and was capable of producing electric power for new enterprises. Three hydroelectric plants (the third, a small one, built at the lowest cascade) were built to function as a single automatically-controlled power system. But although many of the enterprises now have their own thermoelectric power plants, there is still a shortage of electric power in Stalinabad, particularly in winter when the drainage of the Varzob River is sharply reduced. That shortage will be eliminated when the large Perepadnaya Hydroelectric Plant, now under construction on the Vakhsh Canal, is completed. In the summer its power will be used for the mechanical irrigation of the Vakhsh Valley, and in the winter for the Stalinabad power network.

Stalinabad is the largest industrial center of the republic. In 1955 it accounted for about 28% of the entire industrial output of Tadzhikistan; the light and food industries are among the leading ones, accounting for about 80% of the city's industrial output.

Stalinabad is a large consumer of various local foodstuffs, and this affects the structure of agricultural production in the adjacent territories. Vegetables, potatoes, fruit, and grapes are important staples of the city population's diet. These cultures ripen at different seasons of the year, in view of the diversity of natural conditions in southern Tadzhikistan, and the fruit-and-vegetable season therefore lasts about 3/4 of the year. Besides, certain cultures grow best in certain districts. Thus, most of the potatoes shipped into the city come from the eastern mountainous areas where the summers are cooler and the quality and yield of the potatoes are higher. Cantaloupes and water melons, on the other hand, grow well in the lower, hot valleys where there is an excess of irrigation water.

Stalinabad is not only the largest industrial center, it is also the center of political, scientific, and cultural life in Tadzhikistan. The qualified cadres required by the republic itself are trained in that city. In 1925 Dushanbe had only 3 elementary schools. Modern Stalinabad has about 30 elementary and middle schools attended by more than 20,000 children. The first Tadzhik state university was opened there in 1949. The city also has a medical, an agricultural, a polytechnical, and 2 pedagogical institutes and 6 specialized middle schools. Teachers, doctors, agronomists, geologists, and other specialists educated in the schools of the capital are now working in every part of the republic. Also located in Stalinabad is the Academy of Sciences Tadzhik SSR, which works in close contact with the wide network of scientific institutions of the republic. An important part in the cultural development of the republic is played by the large printing machine combine; millions of periodicals and books, published in 3 languages, come off those printing presses annually. Unions of soviet writers, composers, artists and architects, which unite large creative collectives, work in the capital, Stalinabad has 3 theatres -- the Bol'shoy Theatre and 2 dramatic theatres -- a state philharmonic orchestra, a circus, several cinemas, parks of culture and rest, a water-sports stadium, and other stadiums.

Stalinabad is situated in a climatically favorable spot of the Gissar Valley, at the upper part of the alluvial fan of the Varzob River which is far enough from the swampy bottom land of the Kafirnigan River. The wide and flat terraces of the Dushambinka River are suitable for large-scale construction. The microstructure of the city's territory is favorable also in that it is not menaced by a shortage of water, as the summer drainage of the Varzob River amounts to 100 cu m per second. Its potential hydroelectric power is about 80,000 kw, which would justify the construction of a number of hydroelectric plants on the cascades. The third and highest terrace over the Dushambinka River, about 30 m high, is almost entirely under construction. The city has expanded to the South and West, occupying the other terraces. Construction has recently been started on the right bank of the river. Among the projects already completed are Komsomol Lake with the water-sports stadium, another large stadium, a concrete plant, and the Sovetskiy Settlement inhabited by the builders of Stalinabad. The Large Gissar Canal originates there.

Stalinabad is a young city, and its construction is being carried out according to a definite plan. Its buildings are not tall, all of them being surrounded by trees and shrubbery. The predominance of low buildings is determined by seismic conditions.

A characteristic feature of Stalinabad are the various settlements built within the city limits at different times, such as the Sovetskiy, Severniy, Kirovskiy, Zavodskoy, Klinicheskiy, and other settlements.

The well-distributed settlements retain their importance as districts of a big city; the unplanned and random construction of the past has given way to the construction of beautiful buildings, well-planned gardens, and parks.

Stalinabad is one of the greenest cities of Central Asia. The locale occupied by the city slants down in 2 directions: toward and parallel to the river, along an inclined alluvial fan. This makes it easy to irrigate the city territory by large irrigation ditches which get their water from the Varzob River and distribute it, by the gravity method, to the streets, gardens, and plant nurseries. Many of the city's streets resemble avenues, their sidewalks run between lines of trees under a dome of foliage. The trees consist of maple, poplar, catalpa, white acacia, plane trees, and willows. There are still very few coniferous trees to decorate the streets when the other trees shed their leaves. A shrub-like white cedar plant has been planted for some time in Stalinabad; it blends with the flower beds around the houses and is an excellent, decorative plant. The botanical garden in the northern part of the city has 400 species of arborial and shrubbery plants and about 300 different types of grass-like plants indigenous to various regions of the world. In addition to the botanical garden, the city also maintains 2 plant nurseries and 3 city gardens containing a larger variety of plants than those growing on the city streets and boulevards. The botanical garden and the plant nurseries are already used as a rich source for the improvement of the city's "green architecture."

The line of buildings extending from the northern to the southern fringes of the city is almost 10 km long. The city is narrowed down toward the North by the eastern hills approaching the river, and it tapers off to the North of the botanical garden.

Stalinabad is excellently planned: its streets running from North to South and from West to East, are wide and straight and they intersect at right angles. The streets running in a meridional direction point to the Gissar Mountain Range and are well aired by the prevailing winds coming from the North. The major boulevards lead to the 4 possible approaches to the city.

The meridional ulitsa Lenina, which divides the city into 2 parts, is also the city's main artery inasmuch as all the outgoing and incoming roads cross it or run into it. It extends across the entire city, first in a north-westerly and then in a northerly direction. It is crossed by wide streets at right angles. In its appearance, ulitsa Lenina is typical of Stalinabad and the other new cities of Central Asia. It is a boulevard consisting of a number of avenues divided by irrigation ditches. This street is dotted with squares, parks, and the largest

public buildings in the city. At the southern end of the street, not far from the railroad station, is the cinema Vatan (Motherland) Cinema, built in the oriental style. Further down are the austere-looking buildings of the state university and the Presidium of the Tadzhik Academy of Sciences. Towering over Moscow Square, which is decorated with fountains, a pool, and flowerbeds, is the building of the Tadzhik Academic Theatre of Opera and Ballet. Not far from the opera theatres is an attractive 2 story building with semigabled windows containing the busts of Russian and Tadzhik classical writers. This building, one of the most beautiful in the city, regards architecture and interior decoration (built by architect S. L. Anisimov), houses the Public Library of the Republic imeni Firdousi. This "palace of books" contains about one million volumes including the unique books and manuscripts of oriental writers. Next, on Soviet Square, is the largest building in the city, the house of government. Further North, the streets run along the Park of Culture and Rest imeni Lenin. Not far from there are the Regional Museum of Natural History and the State Museum of Fine Arts. Further on, in the Frunze Park section, are the following theatres: The Tadzhik Academic Theatre of the Drama, the Green (Summer) Theatre, and the recently-built House of Culture. A school town containing most of Stalinabad's colleges and specialize schools is located at the very North end of the street. Prominent among the school buildings are the large and well-lighted buildings of the medical and pedagogical institutes. A trolley-bus line runs along the entire length of ulitsa Lenina, from the railroad station to the northern settlement.

Located in the Gissar Valley now, besides Stalinabad, is the rayon city of Regar and several city-type settlements. Almost all of them have one or 2 industrial enterprises.

Regar is in the western part of the Gissar Valley. Its distance from Stalinabad (60 km) and location in the heart of the cotton country have determined the direction of its industrial development. The most modern cotton processing plant in the republic was built there as far back as 1938. Later on an oil manufacturing plant was added.

The city-type settlement of Ordzhonididzeabad (formerly Yangi-Bazar), 23 km East of Stalinabad, is located at the terminal point of the railroad in the Gissar Valley. Converging at this point are automobile highways from the southern Tadzhik grain areas, and one of the first and largest flour milling combines of the republic is located there. The settlement is surrounded by cotton fields and it has the third largest cotton - processing plant of the Gissar Valley.

The large city-type settlement of Takob was built in the Takob Mountain gorge, 48 km North of Stalinabad, on the rich fluorspar deposits. (Fluorspar is a mineral, calcium fluorine (CaF_2). It is used in metallurgy

as a flux for lowering the temperature of metal smelting (Marten process, alumium smelting); in the chemical industry for obtaining hydrofluoric acid and for the impregnation of railway cross ties; it is also used in ceramics for the production of enamel as well as in glass and optical glass production). Mines and a concentration plant were built in Takob.

Other industrial enterprises were built also in other places of the Gissar Valley: a hydroelectric station in the Varzob rayon center, a fruit canning plant in Cheptura, a geranium processing plant in Pakhtaabad, a brick-and-tile plant in Gissara, etc.

All the mentioned centers are undergoing expansion and improvement. New houses, schools, cinemas, hotels, power plants, and water-supply systems are under construction; combines, stores and restaurants, designed to cater to the daily needs of the people are being opened; the streets are being paved with asphalt and lined with trees, and communication with other centers and Stalinabad is being established.

This constellation of new centers near Stalinabad shares some of this city's productive as well as cultural and educational functions. For example, a number of the republican schools are now located in these centers, not in Stalinabad: the school for training physical education teachers for middle schools is in Ordzhonikidzeabad; the 3-year republic school for training educators is in Koktash, and the school for mechanization workers in agriculture is in Cheptura.

Opening into the wide Gissar Valley from the North is a number of mountain gorges at 1,000 to 2,500 m above sea level. These gorges extend tens of kilometers up the slope and in some places reach the watershed range. They are all inhabited. Unlike the Gissar Valley collective farms, the mountain kolkhozes specialize in agriculture on unirrigated land (grain and oil-bearing cultures) and animal husbandry; they also engage in silkworm breeding and horticulture. There is very little irrigated land up there, and every little patch of it -- planted to lucerne, vegetables, or fruit -- is therefore carefully cultivated. The economy of the mountain kolkhozes is considerably poorer than that of the valley kolkhozes, and the collective farms, which have to operate under particularly difficult natural conditions, have been moving to the cotton districts.

The Varzob Gorge is the most densely populated and economically important. The Stalinabad Ura Tube automobile highway runs across it. The Upper Varzob State Power Plant was built where the gorge emerges from the mountains. The Takob Combine is situated in one of its side gorges. Another gorge, -- Khodzhi-Obigarm -- at 1,700 m above sea level, contains hot mineral-water springs. A health resort was built

there. At the highest part of the gorge are the Ziddin Coal Deposits. Cold springs of mineral water of the Narzan type are found in a number of places on the Gissar Mountain Range; the most powerful of them, the Khodzhi-Sangkhok, are 3,030 m above sea level. Some of the springs are partially utilized to meet the demands of the Stalinabad population.

The eastern fringe of the Gissar Valley (Fayzabadskiy Rayon) occupies the lower part of the mountains and has a flatter topography than the Gissar mountain slopes. There is very little irrigated land there. The large flat stretches of unirrigated land are cultivated largely by machine. The major aspects of agriculture are grain growing and animal breeding. (The collective farms' financial income from grain and oil-bearing culture accounts for 45%-60% of their total income, and their income from animal breeding for 25%-40%.)

The Gissar Valley has good transportation connections with the valleys of southwestern Tadzhikistan, particularly with the Vakhsh Valley.

Southwestern Tadzhikistan

This region covers the southwestern part of Tadzhik SSR; it borders on the Gissar Valley in the North, on southeastern Tadzhikistan in the East, on Afghanistan in the South, and on the Uzbek SSR in the West. It includes several wide valleys which fan out in different directions. Examples are the Vakhsh, Kafirnigan, and Kirovabad Valleys, which are separated by low and arid mountain chains. The territory of the region (its valleys and watersheds) as a whole declines from North to South. The Vakhsh and Kafirnigan Rivers flow in the same direction. In the South the region is bounded by the river Pyandzh and, past the confluence of the Pyandzh and the Vakhsh, by the Amu-Darya. The region occupies an area of 10,100 sq km. The population is concentrated mostly in the 3 above-mentioned valleys, which contained 148,200 people in 1939.

Before the revolution, the region was part of the Bokhara khanate. Only the Kafirnigan and Pyandzh (Kirovabad) valleys were inhabited; the Vakhsh Valley, the largest of them all, remained practically uninhabited.

A great effort has been made under the Soviet Government to irrigate the desert land and reclaim the marshy territory in these valleys for the purpose of planting them to cotton and other technical cultures. One-hundred thousand hectares of land were under cultivation in the region in 1955, including 60,000 ha of cotton fields. Over 40% of the republic's cotton crops and almost all the thin-fiber cotton varieties are raised in this region. Substantial quantities of oil-bearing cultures, jute, and other subtropical and tropical cultures are raised in the southern

valleys in addition to cotton. There is very little grain grown in the region, as it cannot be raised on unirrigated land in this dry area, and the irrigated land is therefore used to raise more valuable cultures.

The low-yield desert-steppe pasturelands of the region are best suited for sheep-raising, particularly astrakhan sheep, which are less discriminating in regard to fodder. Most of the 700,000 head of cattle available in the region in 1955 consisted of sheep and goats. Sixty percent of all the astrakhan sheep of the Tadzhik SSR are concentrated in this region. Three of the republic's 4 state sheep farms can be found in the open plains of the region.

The industry of the region specializes primarily in processing local agricultural raw materials: raw cotton, cotton seed, grain and oil-bearing cultures; building materials are produced from local raw materials.

Every valley included in this region differs from the others in its natural and economic conditions, but their similarities are greater than their differences.

The Vakhsh Valley, the largest and economically most advanced, is located in the center of the region. It is situated at the lower course of the Vakhsh River, which joins the Pyandzh to form the Amu-Darya River Extending over 100 km in a meridional direction, the valley is up to 25 km wide in its northern part, narrows down to 7-10 km toward the middle, and becomes wider again in the southern part. Its flat part alone, which is accessible to irrigation, covers more than 1,500 sq km. The valley is surrounded by low mountains from 3 sides; from the West the mountains decline fairly steeply toward the Vakhsh River, in the North their slopes are flat, and on the Afghanistan side there are no mountains; the altitude of the valley is 350 to 450 m above sea level.

The Vakhsh Valley is one of the warmest districts in the Soviet Union. The average winter temperature is 1°-3°, and the average summer temperature is very high, about 30°. The hot, dry, and sunny summer makes the valley warmer than Egypt in summertime. This makes it possible to raise warmth-loving subtropical and even tropical cultures in the valley. At the same time, the valley climate is very much of the continental type. Although there is no snow in wintertime, the temperature goes down to 23°-25°. The heat-loving perennial cultures (citrus fruit and olives) cannot therefore be left to grow in unprotected soil; even pomegranates, figs, and grapes have to be protected with additional soil above the ground in wintertime. The amount of annual precipitation is less than 300 mm and in some places not more than 150 mm. Normally, there is not a drop of rain for a 4 month period during the summer. Only artificial irrigation can make agriculture possible under these prevailing desert conditions.

Many years ago, this fertile valley attracted a large population. Dry remnants of ancient canals and ruins of old fortresses and large villages are still found on the third, and widest, terrace. Later on, however, the valley was all but abandoned. Before World War I there were only 2,200 households in the valley, occupied mostly by semi-nomadic Uzbeks and Turkmenians. They had about 35,000 head of cattle, mostly goats and sheep. Astrakhan sheep were raised by the Turkmenians of the 2 southern villages, Dzhilikul' and Kara-Turkmen. The exhausted land was simply abandoned. "This year the crops are planted in one place, and next year in another; the land is rich, and there is only a handful of people here" (A. A. Semenov). Much grain was planted but very little cotton. There was no industry. A small amount of raw cotton was shipped to Termez which had the only cotton processing plant in eastern Bokhara.

In the first years of the existence of the Soviet Government, the valley was almost depopulated by the incessant Bashmachi attacks. Even as late as 1926 (the year of the first census of the population), when part of the population had returned to their homes, the entire valley including the territory North of the Vakhsh River had a population of 11,500 people. The region was thus very sparsely populated at the time its economic development began.

The following 3 problems had to be urgently solved before the valley could be exploited: building roads, irrigating the desert, and populating the desert.

Not until after the construction of the Termez-Stalinabad railroad line was it possible to tackle the problem of reclaiming the deserts of southwestern Tadzhikistan; first of all the Vakhsh Valley, which had been cut off from the outside world by mountains and the lack of roads. In 1932, a good highway, 110 km long, was built between Stalinabad and Kurgan-Tube, and a bridge was built across the Vakhsh River. A narrow-gauge line extending along the valley from the beginning of the canal to the Tower Pyandzh quay on the Amu-Darya River was built at the same time. It was designed, first, to haul freight along the canal under construction and, later, to transport cotton.

The existing canals were capable of irrigating only a small portion of the land. Much of the land in that area became swampy and alkalized as a result of centuries of exploitation of the canals and the poor irrigation methods. But east of the valley there were broad plateaus (upper terraces) with fertile sierozem (gray desert) soil which had never been irrigated. It required complicated engineering installations to get the water up there. That is how the Large Vakhsh Canal, one of the largest construction projects of the first part of the Second Five-Year Plan,

was conceived and built in 1933. A whole river, draining at the rate of 100 cu m of water per second, was shifted toward the valley terraces. A dam with 7 sluice-gates passing the river water into a deep depression, the upper part of the canal, was built on the left bank of the Vakhsh River not far from where it leaves the mountains. The canal extends tens of kilometers to the South and branches off into numerous sleeves on the way. Some of those branches supply water to the previously irrigated fields, mostly on the third terrace, and others to the newly irrigated land on the fourth and fifth terraces (plateaus) which could not be irrigated by the gravity method before.

Large-scale irrigation work is underway in the Vakhsh Valley even now. More than 20,000 ha of new land will be irrigated there during the Sixth Five-Year Plan. The high fourth and fifth terraces -- comprising the Akgazin, Urtaboz, Kafyr, and Kumsyngir massifs -- will be prepared for cultivation. To many of the sections the water will be supplied by pumping stations. The large Perepadnaya hydroelectric power plant is under construction on the Akgazin branch of the Vakhsh Canal. Another and still more powerful hydroelectric power plant, the Golovnaya, is under construction on the Vakhsh River itself. In the summer the power of the Perepadnaya State Power Plant will be used for irrigating the land by machinery and for facilitating the vertical drainage on the old irrigated land and other needs of the Vakhsh Valley. In the winter the water will flow to Stalinabad along the conduits already built.

The new area planted to cotton required not only a good deal of the labor involved in cotton growing but also a great deal of construction and maintenance of roads, bridges, canals, and reservoirs. Such work could be carried out only by a permanently settled population, which the region lacked. Only the mass migration from the mountainous districts, which had been going on for many years, could supply the economy of the valley with the necessary labor force.

The settlement of the valley began back in the Second Five-Year Plan. Entire collective farms with their equipment and cattle moved down the valley. New inhabited points sprang up one after another, new city-type settlements came into being (Vakhshstroy, the Tower Pyandzh Quay, and the Kirov State Farm) and the following new rayons and rayon centers were formed: Kaganovichabad, Molotovabad, and Oktyabrsk; the city of Kurgan-Tube grew into a large industrial center.

The entire population of the Vakhsh Valley is concentrated in the flatland part of it, which is the only suitable place for artificial irrigation. The valley population in 1939 was 125,000 according to the census.

But despite the large-scale movement of kolkhozniks to the Vakhsh Valley, there was still a large area of unused land and plenty of water, and the problems involved in the expansion of cotton growing were still urgent. That prompted the establishment of the first cotton-raising state farms in the valley. There were 5 of them at first, and only 2 enlarged sovkhozes now -- the Kuybyshev and Kirov sovkhozes -- which produce tens of thousands of tons of cotton annually.

In 1955, 45,000 ha were planted to cotton in the Vakhsh Valley. 80% of that cotton consisted of thin-fiber varieties. It takes a sum total of about 4,000° temperature and an average daily temperature of not less than 15° to raise these grades of cotton within the existing growing season. The Vakhsh and the other southern valleys can meet such requirements: in Kurgan-Tube the total temperature for the season is 4,610° and in Nikoyanabad 5,002° (based on the 5-year average from 1942 through 1946). Experiments with thin-fiber cotton began as early as 1927, but for a number of years its yield was very low; one to 4 centners per hectare. Large-scale experimental work on new high-yield grades of cotton is being done by the experimental cotton-lucerne station established in the Vakhsh valley in 1930. In 1955 the Vakhsh Valley kolkhozes picked an average of 22 centners of thin-fiber cotton grades per hectare, and some of the collective farms, brigades, and field teams picked as much as 40-70 centners per hectare.

Important among the other subtropical cultures is the geranium oil-bearing plant raised in the southern part of the Vakhsh Valley. Its green pulp is processed at the Molotovabad Geranium Factory. New cultures, such as lemons, tangerines, and oranges, have made their appearance in the kolkhoz and kolkhozniks' gardens in the past 5-6 years. Proper agrotechnical measures and maintenance could make these cultures profitable. Very useful work with subtropical and tropical cultures is being done by the zonal station of the All-Union Scientific-Research Institute of Dry Subtropics opened in the center of the Vakhsh Valley in 1935. The varieties of geranium, jute, and lemons developed on the institute's experimental fields are adaptable to local natural conditions and are now being raised by the collective and state farms in different regions of the republic. That station is still experimenting on many different native and imported cultures.

Horticulture and viticulture have for a long time received inadequate attention in the Vakhsh Valley. The first sovkhoz fruit nursery was opened near Kurgan-Tube in 1939. It raised hundreds of thousands of seedling plants of seed and stone bearing fruit, subtropical cultures, and root-stocks for grape vines and distributed them among the collective farms. Every kolkhoz in the Vakhsh Valley now has its own fruit orchard and vine-yard. But the achievements made in this respect are still very modest, and the Vakhsh Valley is still incapable of producing enough raw materials to keep a more or less large fruit-canning plant or wine distillery in operation.

The broad valleys of southern Tadzhikistan are quite suitable for raising animals, especially astrakhan sheep. The total cattle population of the Vakhsh Valley is now 14-15 times as large as in the prerevolutionary period. Occupying large areas in the valley, the state farms play an important part in the development of sheep breeding. About 1/3 of all the sheep and goats are concentrated in these sovkhozes. The Yakka-Din, Kabadian, and Kafirnigan state farms specialize in astrakhan sheep breeding, and the Kuybyshev Sovkhoz in fat-tailed sheep. The valley sheep are kept out in the pastures all year round, and that makes it profitable to raise this particular breed. The winter-spring snow-free grazing lands are used also for cattle from other Tadzhik regions. Efforts are now being made to improve the fodder yield and irrigation of those grazing lands.

The development of industry in the Vakhsh Valley began early in the First Five-Year Plan with the construction of a cotton processing plant at Kurgan-Tube, which lies at the northern exit from the valley. It is now the largest cotton processing plant in the republic, and it produces up to 27,000 t of cotton fiber annually. The cotton seeds were used as raw material for another large enterprise, an oil mill (built in 1932), and the byproducts of that mill were used up by its soap-making department. A large rolling mill went into operation at about the same time, and a mechanical engineering plant was commissioned in 1937. A large combine for the production of building materials is under construction now.

The ancient city of Kurgan-Tube, destroyed and depopulated during the Basmachi invasions, has grown tremendously. It had about 11,000 inhabitants in 1939, including 700 workers engaged in special industrial training.

The increase in the cotton harvest and the expansion of connections with other regions created a demand for new cotton processing plants and better communications. Another large cotton processing plant was built in the village of Uyala North of the Vakhsh Valley, on the road between Kurgan-Tube and Stalinabad. Another cotton processing plant is now under construction in the central part of the valley, in Kaganovichabad.

A narrow-gauge railroad line, running parallel to the highway, was built between Kurgan-Tube and Stalinabad before the Great Patriotic War. It now carries the bulk of the freight in both directions. Grain, cotton fiber, and other raw materials and semimanufactures are shipped from southeastern Tadzhikistan to Kurgan-Tube, Stalinabad, and the wide-gauge railroad line.

Kurgan-Tube's importance as an industrial center was further enhanced by the construction of a combine for the production of building materials and the reconstruction of the mechanical repair plant. Both of these enterprises are designed to meet the needs of the entire Vakhsh Valley.

Kurgan-Tube is also a scientific and cultural center. A soil melioration station of the Academy of Sciences Tadzhik SSR has been at work there since 1936. It helps the collective and state farms in their cultivation of the Vakhsh Valley, particularly in their fight against alkalized soil. The city has a pedagogical school, a school for agricultural mechanization, and a number of other schools and cultural institutions. The city itself is undergoing improvement.

The Vakhsh Valley is changing its appearance. From a desert it has developed into an oasis and is now intersected by highways and railroad lines. This was followed by the creation of industrial centers, stations, and beautiful collective and state farm houses. The new villages with their white and cheerful little houses, frequently hidden in the shade of the tall castor plants are typical of the settlements of the modern Vakhsh Valley.

The Kafirnigan Valley lies West of the Vakhsh Valley and is separated from it by a chain of low mountains. Its oases extend along a narrow strip of land on both sides of the Kafirnigan River and are irrigated by the irrigation ditches [aryk] branching out from the river. The valley had a population of 24,000 people in 1939.

The general economy of this valley is similar to that of the Vakhsh Valley, but is considerably behind in the volume of production. Just as in the Vakhsh Valley, cotton growing is the principal occupation of the population. Nine tenths of the cotton planted are of the thin-fiber variety. The raw cotton picked in the valley is processed at the large and well-equipped plant located in the Mikoyanabad urban settlement, which has also an oil mill.

A narrow-gauge railroad and highway connect the valley, at the Kzyl-Kala point, with the difficult dirt road that runs along the left bank of the Vakhsh River. Another road, the Amu-Darya waterway, links the Ayvadzh quay to Termez.

The Sixth Five-Year Plan calls for large-scale irrigation construction designed to cover 20,000 ha of new lands, mostly in the waterless right-bank area (the Beshkent Valley), which is separated from the Kafirnigan Valley by low hills.

The Kirovabad (Pyandzh) Valley lies Southeast of the Vakhsh Valley and is also separated from it by low elevations. This oasis, which is up to 40 km long and about 8-9 km wide, extends along the right bank of the Pyandzh River and is irrigated by the main canal, which gets its water from that river. In 1939, the valley population was 10,000 people.

There is much less crop land and cattle than in the Vakhsh Valley. The production of thin-fiber varieties and jute constitute the major branches of agriculture. Jute is an annual plant of Indian origin, and it yields a longer and stronger industrial fiber than any other bast culture. Its cultivation here began in 1950, and it is now planted on a considerable area. A jute growing state farm was opened in the Kirovabad Valley.

A cotton-processing plant, an oil mill, and a jute-processing plant are in operation in the city of Kirovabad. The Kirovabad and Vakhsh Valleys are connected by a dirt road. Part of the freight is shipped via the Pyandzh River through the Faizabadkal wharf.

Southeastern Tadzhikistan

This region lies between the Pyandzh, Vakhsh, and Obikhingou rivers and is bounded by Central Tadzhikistan in the Southeast, Northeast Tadzhikistan in the West, and Afghanistan in the Southeast. It occupies an area of 12,000 sq km and was populated by 210,600 people in 1939. The average population density here is almost twice as high as the average for the republic.

The relief of this region is very complicated. Its northern and eastern parts are covered with mountain ranges whose spurs branch off in southern and southwestern directions forming mountain and hill chains. This area drops from an altitude of 3,000 m and over in the Northeast (the Darvaz and Passigusum mountain ranges) to 400 m in the Southwest (the Pyandzh River valley). A hill-chain type of relief is typical of the major part of this region up to about 1,500-1,600 m above sea level.

The Pyandzh River flows only along the boundary of southeastern Tadzhikistan, so that the region itself is irrigated by its tributaries, which are small rivers. The most significant among them is the Kyzylsu with its tributaries the Yakhsu and the Tayrsu. Narrow in the mountain areas, the valleys of these small rivers become much wider in the hill-studded plain. Thus the Yakhsu River Valley is 8-10 km wide in the Kulyab City Rayon, and the valley of the Kyzylsu River, not far from its confluence with the Pyandzh River, is at least 15 km wide. The lower parts of the valleys are swampy and covered with tugais. Large tugai areas are found at the confluence of the Kyzylsu and Pyandzh rivers. Much water is carried by the small rivers only during the spring thaw and the rain season. They hold very little water during the summer. For example, the drainage of the Kyzylsu River during its spring high-water mark period is up to 350 cu ft per second, and only 10-15 cu ft in July-August. The Tayrsu River is almost completely dry at its lower reaches during the summer. That is why irrigated agriculture within this region is rather

limited despite the broad valleys and the large stretches of land. The utilization of the Pyandzh River and the clearing of the tugai vegetation offer greater possibilities for agricultural development in the southern part of the region.

The various parts of the region are characterized by different climatic conditions. The climate in the lower southwestern parts is very dry, and the annual precipitation there is less than 300 mm. As in the Vakhsh Valley, the summers are hot and the winters warm. The irrigated land can produce the best warmth-loving cultures of the Soviet South: thin-fiber grades of cotton, jute, and southern varieties of fruit. This is one of the few spots in Tadzhikistan where figs and pomegranates are not affected by frost and do not have to be protected by earth mounds in wintertime. There is more moisture in the northeastern part of the region. The precipitation there, about 500-750 mm annually, makes it possible to cultivate plants without artificial irrigation, and all the gently sloping divides produce agricultural crops without irrigation. The herbage, consisting mostly of cereals and a variety of other herbs, grows well under the prevailing conditions. A considerable number of the republic's winter pastures is concentrated in southeastern Tadzhikistan.

Pistachio trees, producing a highly nourishing oil-containing fruit, grow on the hills and low-mountain chains. In the more humid valleys and depressions grow greek walnuts, mulberry trees, grapes, apricots, and other fruit trees. Cotton, rice, and other cultures are raised on the irrigated land.

The major forests are found in the high-altitude belt. Incidentally, there are no forests here in the real sense of the word, only groups of trees or scattered thickets in the form of parks. The predominant species of trees are greek walnuts, Turkestan maple, saddle trees, and dog rose. The large wintertime accumulation of snow in the mountainous belt brings about turbulent floods along the small rivers in the spring.

Among the important minerals found in the region is rock salt, which is concentrated near Kulyab in 2 gigantic salt pots, Khodzhasartiz and Khodzhamumin. Small deposits of hard coal, lead, and gold have also been found. Building materials are available in a number of places.

The population is concentrated mostly in the valleys. Gradually retreating to the mountains, the Tadzhiks have settled in the central and upper parts of the valley since ancient times, and the lower parts remained sparsely populated. The Tadzhik peasants avoided the broad open valleys, which were unprotected against invasions by nomads. Agricultural work there was made difficult by the floods, the tendency of the land to become swampy, and the rapid growth of the tugai vegetation.

The prerevolutionary population of the lower parts of the broad valleys was not numerous but multinational and nomadic in character; it consisted of Uzbeks, Turkmenians, Kirgizians, Khazars (descendants of the Mongols) Afghans, Gypsies, and others. The broad and almost waterless plateaus (such as the Dangerian Plateau, for example) were practically unpopulated and were used as seasonal pastures. But the narrow mountain valleys were also unsuitable for large-scale settlement in view of the lack of cultivable land and water. There are no glaciers or snow banks in the upper reaches of the small rivers, and the precipitation penetrating the mellow soil is only enough to feed small springs capable of supplying water to 2-10 households each. That is why the mountainous valleys of southeastern Tadzhikistan have more tiny settlements than even the highest-altitude districts of the republic. Seeking shelter in the narrow valleys, the Tadzhiks suffered from a shortage of land. But agriculture and, to some extent, stock breeding continued to be their major occupation.

The old independent southeastern principalities were annexed to the Bokhara khanate in 1870. The territory of that region was divided into 2 bekdoms, Kulyab and Bol'duzhan. The latter were administered by 2 of the emir's vice regents or beks, who rode roughshod over the people. Those beks were frequently changed, and each one of them tried to derive the maximum personal advantage during his tenure in office. One of the most famous dekhkan uprisings against the emir and his beks, in 1885 (the Vose Rebellion), provides eloquent testimony to the plunder and oppression exercised by the beks and their retainers.

This region suffered from Bashmachi violence more than any other place. The Soviet Government was established there later than in the other regions, and its progress was slower. Economic development was based on the favorable natural conditions of the region and its comparatively dense population. Grain cultivation on unirrigated land assumed greater proportions as did the planting of valuable technical cultures on irrigated land. Stock breeding -- especially of sheep and goats -- was also expanded. The present industry consists of cotton-processing, oil-manufacturing, and jute-processing plants.

About 170,000 ha of land are under cultivation in the region. About 2/3 of that land is planted to grain cultures and the rest to oil-bearing cultures, cotton, jute, etc.

Southeastern Tadzhikistan is the leading grain-producing region of the republic; it produces 1/5 of the overall grain crop. Wheat ranks first in that crop and barley second. This region exports grain and supplies bread grain to the population of the neighboring cotton-growing valleys. The other cultures raised here include oleagenous flax (zigir'), sesame, millet seed, bean cultures (kidney beans, lentils, and peas) and lucerne.

The distribution of agriculture in the region is in some measure determined by the natural characteristics of its various parts. The higher and comparatively moist parts of the region are most suitable for unirrigated agriculture. Considerable stretches of land are now being ploughed up and planted there. From the narrow mountain valleys, where the Tadzhik dekhkan once cultivated his small plot of ground with a wooden plow or hoe, agriculture has now been extended to the wide inter-river areas where the large collective-farm fields are worked by tractors, combines, and other machinery. The collective farms of the unirrigated zone get 70%-80% of their financial income from grain and oil-bearing cultures and animal breeding. The grain-producing kolkhozes alone are served by several MTS.

The irrigated agricultural land is concentrated in the lower valleys of the region. This area is about 1/10 the size of the unirrigated land but it is considerably more profitable. The leading crop there is cotton; it accounts for almost 90% of the kolkhozes' financial income. All the cotton-growing collective farms are served by MTS. Only 10,000 dessiatines had been planted to cotton of the local Asiatic variety (guza) in south-eastern Tadzhikistan before World War I. The cotton was not processed locally, but shipped to the Termez Cotton Processing Plant, the only one in that vast area. The freight was shipped by pack animals 120-150 km to the Fayzabadkal wharf and from there by kayuks down the Pyandzh River to Termez. More than 25,000 ha of land are now planted to cotton, and all of it is processed locally. Most of the cotton grades produced are still of the medium-fiber variety, but it is also possible to raise thin-fiber cotton.

There are good prospects for the development of agriculture on the irrigated land of the southern and warmest part of the region. The lower part of the Kyzylsu River Valley and Pyandzh River Valley form a single vast lowland area much of which is covered with tugai vegetation. Judging by the remnants of an old irrigation network, this lowland was once used for agriculture, but later abandoned. There was nothing to prevent the Pyandzh River from flooding the lowland and eventually turning it into swampland. All this moist massif came to be known as "Miten-Tugai" or strong reed. The exploitation of Miten-Tugai began under the Soviet Government. The concrete dam built on the Main Chubek Canal before the war prevents the Pyandzh River from flooding the lowland. But the real fight against the tugai vegetation has only started. The Sixth Five-Year Plan calls for the irrigation of up to 30,000 ha of land (partly by the gravity method and partly by machinery) with the water from the Pyandzh River. Powerful machines have already been shipped there. The gigantic reeds (tugai) are broken up and flattened by S-80 diesel tractors. As soon as it has been dried, it is burned and the land is then fertilized and ploughed by tractors. The reclaimed lands of the Parkharskiy Rayon

and the newly-formed Moscow administrative Rayon are being settled by Tadzhiks from the mountain districts, and new kolkhozes are under construction by the settlers. Cotton is becoming the leading crop of these collective farms. A cotton-growing state farm, Miten-Tungai, was opened in 1950 on the theretofore swampy lowland. Pomegranate-and fig-orchards are now planted by the collective farms. A new village, Moskovskiy, and a MTS were built where the tugai used to be.

There are vast pasturelands in the region, particularly winter pastures. Hundreds of thousands of head of cattle, mostly sheep, are driven to these pastures for the winter season from southeastern and central Tadzhikistan -- from the Vakhsh and Gissar Valleys and even from the Zeravshan Valley. The winters are short and warm in the middle and lower parts of the region, and there is practically no snow. Some of the short-lived vegetation comes back to life with the beginning of the rainy season in October-November, and spring comes at the end of January or the beginning of February. But for a month or 2 in the wintertime there is usually a shortage of green grass on the field, and the cattle have to be fed previously prepared hay. Numerous brigades of kolkhoz hay mowers are therefore sent early in the summer to various sections of the region to prepare haystacks, build sheep pens, and prepare the pastures for winter grazing.

The machines used in those sections are tractors with mowing attachments, selfpropelled hay mowers, ploughs with wide colters, hay stackers, automatic baling machines, etc. The equipment is provided by the MTS. A cattle breeding center with a veterenary hospital, power plant, water reservoir, houses, and cultural buildings was built in the Lyaur section (Dangarinskiy Rayon) which lies at the junction of the transit cattle routes. New underground water sources are found in the waterless but fodder-rich pasturelands, and machinery is being installed for pumping the water through pipes to the watering places. Electric sheep shearing is now practiced in a number of collective farms and in all the state farms.

The stock breeding industry of the region is undergoing expansion. It now has over 600,000 head of all types of cattle. Three fourths of that number consist of sheep and goats. The native breed of the region is the Gissar sheep. The Astrakhan sheep were introduced under the Soviet Government, and they can now be found on every collective and state farm. Part of the sheep and goats are concentrated in the large state farms. The Gissar State Farm, the only one in the USSR engaging in the development of highly productive Gissar sheep, was transferred here from the Vakhsh Valley. This sovkhoz distributes hundreds of pedigree rams annually to the various collective and state farms of the republic. The Dangar Astrakhan Sheep Breeding Sovkhoz, opened on the Dangarian Plateau, has several tens of thousands of sheep. This sovkhoz has started the production of high-grade karakul fur in recent years.

The industry of the region is almost entirely connected with the processing of local agricultural raw materials. Cotton processing plants and oil mills were built in Parkhar and Kulyab as far back as 1928 and 1930. Operationally, these are the most "full-cycle" [glubinniye] plants of their kind in the republic. The considerable increase in the cotton crop provided for by the Sixth Five-Year Plan calls for the expansion of the existing cotton-processing plants and oil mills and the construction of new ones.

The cotton is shipped by truck to Stalinabad and Faizabadkal in the form of cleaned and pressed fiber. The Kulyab-Kurgan Tube narrow-gauge railroad, now under construction, will soon accelerate the shipment of this freight to Stalinabad and reduce the shipping costs.

As has already been pointed out, it was the Soviet government which began the exploitation of many of the region's flatland districts. They have now become industrial centers and sources of agricultural mechanization -- MTS, state farms, and scientific stock-breeding establishments.

The most promising area in regard to the development of agriculture and industry is the southern part of the region located in the triangle between Kulyab, Parkhar, and Moskovskiy Village. The inexhaustible reserves of salt found in 2 gigantic deposits, the rich gas sources, and medicinal mud in this part of the region will speed up the development of a chemical industry and health resorts. This area also has a number of industrial centers, such as the Parkhar city-type settlement with its cotton processing plant and oil mill, Moskovskiy village with its jute plant, and Kulyab with its industrial and cultural institutions.

Kulyab lies in the broad and picturesque Yakhsu River Valley. It was inhabited by 8,400 people in 1939. The town has a cotton-processing plant and an oil mill and a number of small enterprises of the local and cooperative industries. It also has a pedagogical institute, a musical and dramatic theatre, and a number of other cultural institutions. A water-supply system was installed in the town, and its streets were paved with asphalt and planted with trees and shrubbery. This is the modern Kulyab as compared with its old dusty "clay" predecessor which had been used as a residence for the beks of the prerevolutionary eastern Bokhara. Improved dirt roads now radiate from Kulyab in all directions.

Central Tadzhikistan

This region covers the central part of the Tadzhik SSR. It has an area of 20,300 sq km. Its 1939 population was 183,000 people.

Orographically, this region consists of a system of valleys divided by high mountain ranges extending from West to East. Flowing between those ranges in the same direction are the deep rivers Surkhob (a segment of the Vakhsh River), Obikhingou (the left tributary of the Vakhsh), and Pyandzh. The latter irrigates part of the territory in the South. The principal economic activities of the people of this region are connected with the river valleys.

The valleys of the Surkhob and Obikhingou rivers are exposed to the western winds, and the abundant precipitation (700-900 mm) on their slopes facilitate the production of stable crops without irrigation and a comparatively good natural herbage. The upper parts of these valleys boast the best summer pastures in the republic (up to 500,000 ha) which are important also for other Tadzhik regions. Protected by high mountain ranges from the cold winds in the North, these valleys are relatively warm despite their high elevation. The frostless period lasts more than 200 days, and the total temperature of the growing season is 3800° (with a daily temperature above 10°). That temperature is sufficient for growing corn, grapes, and even rice, but it is not good enough for growing cotton. It is considerably cooler in the eastern part of the Surkhob River Valley as well as in the Obikhingou River Valley, but even these places are suitable for grain production. The Pyandzh River Valley is the warmest of them all; it is lower and farther South, figs and pomegranates grow well there, and grape vines do not need any special protection.

In the past, the difficult access to the mountain region made it easier for its principalities to preserve a certain measure of independence. The Surkhob River Valley was part of the Karategin principality, and the Pyandzh and Obikhingou valleys were under the Darvaz principality, all of which were ruled by local princes. Their isolation was to some extent responsible for their economic backwardness. Theirs was a semi-natural economy.

In 1876-1877, when those remote mountain principalities were annexed to the Bokhara khanate and became its provinces, or bekdoms, their economic ties with the other regions were somewhat expanded. Local bazaars came into being, outside merchants brought their wares for sale, and a large part of the male population went to the Fergana Valley every year for seasonal work (about 20,000-25,000 of them at the end of the nineteenth century). But the conditions of the dekhkans deteriorated in view of the increasing taxes levied by the emir and his beks.

The only road between Karategin and the Fergana Valley ran through high mountain passes. The Surkhob and Obikhingou river valleys were connected with the Gissar Valley by a narrow pack-animal path which ran

along the edges of sheer precipices. That path was closed during the long winter months, leaving the valleys completely cut off from the outside world. The road to the Pyandzh river valley ran through still another high mountain pass in the Darvaz Mountain Range.

Transportation was primitive, freight being carried by pack animals and on the backs of human beings. Thus the goods sent across the Karategin and Darvaz mountains by the Kokand merchants were carried by donkeys, but more frequently by mountaineer porters. Little use was made even of the simple Asiatic bullock cart, the freight being hauled by a peculiar contraption called a "chigina" or "ground scraper," which was used in winter and summer.

The economy of the valley consisted of agriculture -- mostly grain production -- and stock breeding of low productivity. The land was tilled with a wooden plough, and the grain was threshed by having the animals walk on it.

The age-old political isolation of the principalities prevented their population from driving their cattle to the winter pastures of southern Tadzhikistan. After a comparatively short summer of grazing in the subapline meadows, the cattle were kept in the kishlaks over the long winter months on an undernourishing diet of straw. That type of care was responsible for the development of the local breed of small cattle and sheep. The average weight of a local sheep is less than 1/2 of the western Tadzhik Gissar sheep. The socalled Darvaz sheep (gadik) is the smallest breed of sheep.

The Soviet Government in garm was not established until 1923, but the Bashmachi gangs continued to roam through the area even long after that and disrupted the socialist construction in its initial stages.

The reconstruction of the economy in the densely populated mountain districts proved to be quite complicated.

There was s shortage of suitable land in the mountains. In 1939 there was an average of about 0.1 ha of irrigated land and 0.5 ha of unirrigated land per capita population. The corresponding per capita shares of land in the Pyandzh River Valley were still smaller -- 0.07 and 0.2 ha. A further increase in population would have decreased those shares, since the total area of arable land was very limited. One of the first problems, therefore, was the systematic resettling of the mountaineers in the lower broad valleys where the arable land was abundant and the population sparse. That problem has in the main been solved. Tens of thousands of households were moved from the Surkhob and Obikhingou river valleys and have now become wealthy cotton growers in the Vakhsh, Kafirnigan, Kirovabad, and other valleys in the southern part of the country.

The first automobile highway, connecting Stalinabad and Garm, was built in the western part of the Surkhob River Valley in 1932. A large suspension bridge was built across the swiftly-flowing Surkhob River at the point of its confluence with the Obikhingou River. The Pamir Highway connecting Stalinabad with Khorog was initially completed in 1940, and the road to Garm became a branch of that highway. The construction of the following roads within the Surkhob River Valley was continued: Garm-Dzhirgatal' to the eastern end of the valley, Garm-Novabad to the new city, Novabad-Shinglich to the vast grain area, and the Novabad-Pamir highway, the shortest road the West which bypasses Garm. Two short automobile roads were under construction also in other valleys.

Despite the enormous difficulties of road construction in these mountains -- where the road builders have to be suspended from ropes between the precipitous cliffs -- such roads are now laid in short periods of time, thanks to modern techniques and mass heroism. Thus it took only 3½ months to build the big Pamir Highway, which is 556 km long and crosses some of the greatest mountain ranges and gorges.

There are no more "ovringi" along the edges of precipices, to which the wayfarer held on "like a tear drop to the end of an eyelash" (from Bedil's poem carved on one of the roadside rocks in the Zkhmatabad Mountains). Grain, potatoes, animal products, and cocoons are now shipped westward by truck. Going in the opposite direction are industrial manufactures, gasoline, motor cars, and foodstuffs. Short automobile roads now extend to the lateral gorges, toward the highway, connecting it with the mountain kishlaks and opening a way to the valley for grain, coal, cocoons, and other raw materials.

The economy of the region is still predominantly agrarian, and the major occupations are agriculture, stock breeding, and silkworm cultivation.

The total area under cultivation in the region is about 70,000 ha, which is considerably less than before the Great Patriotic War, as many families left the region. The unirrigated land accounts for 80%-90% of the crops. Grain cultures, primarily wheat and barley, predominate. Prominent among the other cultures is curly flax.

The cattle herds, numbering about 200,000 head, consist mostly of sheep and goats. In view of the exceptionally low productivity of the native breed of cattle, inherited from the past, great efforts are now being made to improve the breed through cross-breeding.

Silkworm breeding is one of the new and rapidly growing industries. In recent years Central Tadzhikistan has been producing 12%-15% of all the cocoons produced by the republic.

The largest and economically the most important part of the region is the Surkhob River Valley where 2/3 of the region's population (in 1939) and a major part of its cattle and croplands are concentrated.

The name Surkhob refers to the central segment of the Vakhsh River between its left tributaries, Muksu and Obikhingou. The Surkhob River Valley extends over 150 km from East to West, separating the Zeravshan and Alay mountain ranges in the North from the Petr Pervyy Range in the South. The valley bottom drops from 2,000 m absolute altitude in the East to 1,000 m in the West. The major mountain ranges surrounding the valley are 1,500-3,500 m above the valley bottom; the mountain slopes of Petr Pervyy Range are comparatively short and steep, while those of the Alay-Zeravshan mountains are long and flat. During the flood season the Surkhob extends beyond its bank up to a kilometer or more, branches off into numerous sleeves, and flows on comparatively quietly. It is possible to ford it at some places while at others it flows swiftly along a single narrow riverbed.

In 1939 the Surkhob River Valley was populated by more than 118,000 people. The majority of them were Tadzhiks. The eastern (Dzhirgatal') district is inhabited by Kirgizians, who account for about 7% of the valley population. Kirgiz nomads first appeared in this region in the sixteenth century and settled along the Alay. They occupied the larger part of the Surkhob River Valley, but were gradually crowded back by the Tadzhiks, and by the nineteenth century were confined to the easternmost part of the valley.

Agriculture and stock breeding constitute the major occupation of the population, and silkworm cultivation is widespread also in the western part of the valley. While they led a nomadic life before the revolution, the Kirgizians have now also become agricultural workers. Most of the agricultural land is unirrigated. The unirrigated land under cultivation is found, as a rule, on the well-watered and frequently steep slopes of the valley, and the irrigated fields are on the bottom of the valley, on the terraces, and in the alluvial fans. Besides grain, the crops raised on the irrigated land include lucerne, potatoes, curly flax, millet seed, beans, and corn. Before 1930 the mountain Tadzhiks did not know much about potato growing, but potatoes are now grown on large areas and produce abundant crops, some of which are even shipped to the lower valleys. The agricultural techniques used in the mountains were primitive. The most primitive hand-made agricultural implements were used for years. Now the tractor has made its appearance in the mountains. An MTS was opened as far back as 1948 on one of the broad terraces on the left bank of the Surkhob River near Tadzhikabad (formerly Kalay-Lyabiob). The tractors, combines, threshers, and other machines of that MTS can now be seen

throughout the valley, cultivating thousands of hectares of land. Horse-drawn ploughs and harrows are used in some small sectors and on steep slopes that are inaccessible to the tractor. But there still is a large number of isolated and inaccessible places where draft animals have to be used instead of tractors.

Next in importance in the economy of the Surkhob River Valley is stock breeding, which now gets a great deal of attention. In the past, the mountain Tadzhiks were able to use summer pastures only. They had no access to winter pastures. Under the Soviet Government the rich sub-alpine meadows (the Lyakhsh, Tupchak, and other sections) were made available not only for the cattle of the local collective farms, but also for the cattle driven here from southern Tadzhikistan. The Surkhob Valley kolkhozes, in turn, were given the opportunity to drive a considerable part of their cattle to the winter pastures of southern Tadzhikistan. This has also served to improve the feeding of the cattle left in the sheds back in the valley. The Gissar breed of sheep, well adapted to year-round life in the various open pastures, is rapidly replacing the little-productive Darvaz sheep. Besides, the cross-breeding of the Darvaz sheep with the mountain ram produced a new breed of mountain sheep which is twice the size of the Darvaz sheep and yields 4 times as much wool. Experiments designed to improve the productivity of cows have been under way for a long time. The Garm State Farm for Pedigreed cattle has been functioning in the Surkhob River Valley since 1938. Later, a government cattle breeding farm was opened in Tadzhikabad. These 2 farms have been cross-breeding the local mixed breed of cows with the "Shvits" breed and turning their offspring over to the collective farms. The average milk yield of the new breed of collective farm cattle is now double that of the native cattle. The annual milk yield of every grain-fed cow of the Garm State Farm is more than 1,500 l.

Silkworm cultivation represents the commercial branch of agriculture. Some of the collective farms derive most of their financial income from the sale of cocoons. The Garm Mulberry Tree Nursery has stimulated the increased planting of those trees. Entire groves of such trees can be seen in some places. The cocoon drier is now in common use in many kishlaks.

Horticulture and viticulture are still not well developed despite the favorable natural conditions for such cultivation in the valley — particularly for horticulture. The pears and apples produced in some of the kishlaks are in no way inferior to the best Leninabad varieties. But apricots are still predominant among the fruit. Most of the vineyards are concentrated in the Garmskiy Rayon.

The valley industry is still young and not very large. Salt, granite, lime, and pottery clay are produced in some places for local consumption; the production of rugs is being organized.

Electricity has been introduced in a number of kishlaks in recent years. Collective-farm hydroelectric stations are being built along the swift mountain streams. Larger hydroelectric power plants are in operation in Novabad and Garm. Electric power is used not only for lighting purposes but hulling mills and electric flour mills have been built in some places, and small industrial enterprises are now operated by electric power.

The Tadzhiks live in the kishlaks of the large western part of the valley in clay houses surrounded by vegetable gardens and orchards. Against the gray background of the mountains, the Tadzhik villages look like large green specks, and it is even difficult to discern the houses behind the lush vegetation of fruit and decorative trees.

On the flat terraces and alluvial fans the Tadzhiks frequently build their houses on the nearest mountain slope, regardless of its steepness, with a view to saving valuable irrigated land. But there, too, the houses are hidden in the shade of over-hanging mut and apricot trees, mulberries, poplars, and plane trees.

Everywhere in the valley, on both sides of the Surkhob River, near the water or the mountain slopes, one can see kishlaks surrounded by orchards. Even the slopes of the narrow lateral valleys are covered with the verdure surrounding the kishlaks as far up as the eye can see. Some of the lateral valleys are habitable for many kilometers: 45 km in the Sorbog River Valley, 25 km in the Yaaman River Valley, etc.

The kishlaks and cultivated fields get their water from small streams and springs. In some places irrigation ditches zigzag along the edges of dizzy precipices for several kilometers to deliver water to small flat plots of land. During the past years the collective farms have been building large irrigation canals.

The young city of Novabad and the rayon centers of Komsomolabad, Garm, and Tadzhikabad are the large inhabited places of the Surkhob Valley. They are being improved and expanded by the construction of schools, hospitals, hotels, and modern houses for workers and employees. A pedagogical school has also been opened in Garm.

The eastern part of the valley is inhabited by Kirgizians. Like the Tadzhiks, they engage in agriculture and stock breeding. The Kirgiz villages are less verdant than those of the Tadzhiks. The Kirgizians

irrigated several hundred hectares of land in the lower and broader part of the Obizanku River Valley (a tributary of the Surkhob River). That land is now cultivated by the tractors and agricultural machines of the Tadzhikabad MTS. Grain is shipped westward by truck as well as on sal's (barges made of inflated ox hides held together by a light wooden frame; they can carry up to one ton of freight) down the Surkhob River, which requires a great deal of courage and ingenuity. The Kirgizians have been known for many years as skillful carpet weavers. A small carpet factory, Kzyl Partizan, was opened in Dzhirgatal'.

The other parts of central Tadzhikistan -- the Obi-Garm Administrative Rayon and the Obikhingou and Pyandzy River Valleys -- are very similar to the Surkhob River Valley from an economic point of view, their population and production is lower than that of Surkhob.

The Obi-Garm Administrative Rayon lies in the western part of central Tadzhikistan. Wedged in between the Karategin and Vakhsh mountain ranges, it serves as a natural gateway to the Gissar Valley for the whole of eastern Tadzhikistan. This rayon has MTS and the cultivation of unirrigated land (grain production) is well developed here. The rayon is known for its hot mineral spring and sanatorium at Obi-Garm. The rayon is connected with Stalinabad by a good highway 100 km long.

The Obikhingou River Valley lies between the Petr Pervyy and Darvaz mountain ranges, and it is higher (1,500-2,500 m) and cooler than the Surkhob River Valley. It is comparatively narrow and its mountain sides steep. As a result, it has considerably less cultivable land and pastures. The leading agricultural branches in the valley are grain production on unirrigated land and stock breeding. Along the Obikhingou runs the Great Pamir Highway, which goes up the Darvaz mountains.

The Pyandzh River Valley (Kalay-Khumskiy Administrative Rayon) is on the south side of the large Darvaz Mountain Range. It is warmer than the other Central Tadzhik valleys, but there is very little land suitable for agriculture or stock breeding on the steep mountain slopes. Subtropical cultures can be grown in the narrow strip of land extending along the Pyandzh River. Grain production, stock breeding, and silkworm cultivation are the leading branches of agriculture there.

Western Pamir

The Mountain-Badakhshan Autonomous Oblast covers the eastern part of the Tadzhik SSR. This area (61,100 sq km), covering 43% of the republic's territory, was inhabited by 3.5% of its population (53,000 people) in 1939. The oblast consists of Western and Eastern Pamir, 2 very dissimilar parts from an economic and climatic point of view. Nor is the population of the

2 Pamirs similar. Western Pamir is inhabited by Tadzhiks and eastern Pamir by Kirgizians. The former engage primarily in agriculture and stock breeding, whereas the latter limit themselves to stock breeding. Western Pamir is a high-altitude district with a broken relief, whereas eastern Pamir is one of the highest flat mountain plateaus in the world.

Flowing quietly along the eastern Pamir uplands, the rivers cut a number of gorges in the western mountain ranges, rushing down into the Pyandzh River in precipitous and swift streams. The most populated valleys of western Pamir are at 1,700-2,800 m above sea level, the distances between the valley bottoms and watershed peaks ranging up to 3,000 m and more. Open to the West, this part of the Pamir is warmer than its eastern part (the average temperature in July is 22° and in January -7.6°, and the frostfree period lasts 212 days) and is suitable for tillage and horticulture; viticulture is possible in the lower places. There is little precipitation in this region (200-250 mm per year), and every type of agriculture requires artificial irrigation. The mentioned climatic data apply to the city of Khorog, which lies in the Pyandzh River Valley at 2,080 m absolute altitude. The air is cooler in the higher valleys. In the estuary parts of the valley, for example, the snow stays on the ground less than a month, whereas in the higher parts it lasts up to 6 months. Vineyards, mulberry, walnut, apricot, and apple trees gradually disappear with increasing altitude. Grain cultures, particularly barley, grow as far up as 3,100 m above sea level. Lying above the cultivated land are mountain meadows covered with green and succulent herbage.

Pamir used to be the most inaccessible region of Central Asia. It was not until after the Soviet Government had been established that its territory was criss-crossed by hundreds of kilometers of automobile roads. The first automobile highway (Osh-Khorog) was built in 1934, and the second (Stalinabad-Khorog) was completed in 1940. Stalinabad and Khorog are also connected by regular air transportation. Automobile highways were built out of Khorog to every rayon center during and after the Great Patriotic War. Machinery, commodities, and various products were shipped to Pamir, and its local raw materials found a market in the neighboring regions.

About 90% of the population of the Mountain-Badakhshan Autonomous Oblast live in western Pamir. It consists almost exclusively of Tadzhiks. Their major occupation is the cultivation of irrigated land and, to a lesser extent, stock breeding. A small part of the local population is engaged in mineral processing. Silkworm breeding and horticulture are being developed.

The economic activities of western Pamir are confined to the deep narrow valleys of the Pyandzh River and its tributaries- the Vanch, Yazgulem, Bartang, and Gunt, as well as the latter's tributary the Shakhdara. The Bartang and Yazgulem River valleys are particularly narrow. Alternating with the wider places are narrow and almost impassable gorges with noisy, turbulent streams rushing through them. The Vanch and Pyandzh River valleys are more spacious, some of them measuring up to 4 km in width. A large number of side streams, utilized mostly for irrigation purposes, run into the major rivers. The kishlaks, irrigated croplands, and orchards are located on the terraces, locally known as dashtas, and the alluvial fans. The canyon walls along the side streams are usually too steep to be habitable. Tiny plots of unirrigated land under cultivation are found here and there on the steep mountainsides. All the mountainsides are crossed by numerous horizontal paths worn by the animals. These precipitous paths lead to the canyons where cropland or pastures can be seen again. The total area under cultivation in western Pamir is 11,000 ha (in 1955), i.e., more than twice as much as before the Great Patriotic War. Almost all the crops are planted on the irrigated land which is scattered in small sections on the terraces and alluvial fans which are watered by the irrigation ditches leading from the side streams. The cultivable land of prerevolutionary western Pamir, as the old saying goes, was measured by skull-caps. There was some truth in it, since the average share of cropland per capita population amounted to 0.1 ha. But agriculture is the lifeblood of every Tadzhik mountaineer. Considerable areas of new cultivable land have been reclaimed under the Soviet Government, and the per capita share of land has now been increased 0.25 ha.

The collective farm lands are still cultivated by simple agricultural implements. But there are quite a few fields where small tractors could be used to advantage. (V. N. Ivanov, a soil expert who has studied agricultural conditions in western Pamir for a long time, claims that tractors could be used on 45% of the entire cultivable area of this region.)

Wheat, peas, and barley are the principal cultures grown on 3/4 of the cultivable area. The Pamir farmers frequently plant barley and peas together, and sometimes rye and peas, since this combined planting was found to increase the crops 1½ to 2 times, which is very important in the case of a land shortage.

The expansion of the cultivable land area, the improvement of agricultural technique, and the introduction of new high-yield cultures (such as the "Surkhak" grade of wheat, for example) made it possible to step up the production of grain, the major consumer item of the Pamir people. Since the grain cultures are planted on irrigated land, their crops are considerably greater than in the other regions of the republic. But western Pamir is still incapable of meeting its own grain requirements in view of the land shortage.

The potato is a new culture in this region, unknown before 1935. It is yielding greater crops in the comparatively cool uplands of western Pamir than in any other place in Tadzhikistan.

Vegetables and melon cultures are raised in increasing quantities near Khorog and the rayon centers; the conditions are excellent for the production of watermelons, cantaloupes, and squash. The latter in particular are very large, especially the "pood" grade.

Warm and hot water springs that could be utilized for heating the hothouses are found in many places in western Pamir. The first such hothouse to be heated by a warm sulfur spring was built in 1954 near Ishkashim in the Pyandzh River Valley. The hot houses produce fresh cucumbers, tomatoes, radishes, and other vegetables even in the middle of the winter.

The following varieties of fruit grow well in western Pamir: apricots, peaches, quinces, plums, cherries, apples, pears, Greek walnuts, mulberries, and many others. The Pamir Tadzhiks have been gardeners since ancient times; they developed the best grades of plants, especially the fruit-bearing mulberry tree. Apricots and mulberries are important items of the Tadzhik's diet. The mulberries are dried, crushed, and made into a very tasty paste (tut-pykht) which can be preserved for a long time.

After the revolution, horticulture underwent further expansion in Pamir. A botanical garden and an oblast fruit hothouse were opened in Khorog. The botanical garden of the Academy of Sciences Tadzhik SSR is 2,320 m above sea level. Experiments are conducted here on the development and improvement of fruit and berry varieties that can be grown at high altitudes, and large quantities of seedlings are distributed to the kolkhozes and kolkhozniks' orchards in western Pamir. The workers of the botanical garden demonstrated the possibility of growing grapes at high altitudes, and a number of kolkhozes and kolkhozniks have already planted such grapes in their orchards.

Animal husbandry is another important branch of agriculture in western Pamir. There are more than 200,000 head of cattle in the region, with sheep and goats accounting for 9/10 of the total. (In western Pamir, the goats account for 59% of all the small cattle, whereas in the other economic regions of the republic their numbers range from 11% to 37% (1952)). The predominance of goats is explained by their ability to make better use of the rocky pastures on the steep mountainsides than the other animals, and by the fact that they are capable of replacing cows to some extent. There is very little pastureland and cultivable land in western Pamir, and the high mountains and the lack of roads made communication with the other regions difficult. The cattle was sheltered in the narrow steep-sloped valleys, spending the winters and summers in the poor pastures near the kishlaks. Only during bad weather would they get an additional meager ration of straw, and sometimes hay. These conditions led to the

development of a small and little productive type of cattle in western Pamir; most of the sheep were of the Darvaz breed. Under the Soviet Government the road was opened for the western Pamir cattle to eastern Pamir and further to the Alay valley (Kirgizia). The opportunity was thus created for the development of the large Gissar and Kirgiz breeds of sheep and for the improvement of the Darvaz sheep by cross-breeding with larger sheep. In winter, part of the cattle is kept on the snow-free pastures of eastern Pamir and another part is driven to the Alay Valley for year-round grazing. This has served to improve the fodder supply for the cattle kept in sheds through the winter period.

Silkworm cultivation was started by the western Pamir collective farms only a few years ago. Mulberry trees are now being planted by an increasing number of collective farms, which get their seedlings from the mulberry nurseries and the Khorog Botanical Garden. To many collective farms silkworm breeding has now become one of the most important sources of income.

The extraction of mineral raw materials is a new branch of western Pamir's economy. Valuable mineral deposits were found in the valley slopes, usually at high altitudes. Examples are: mountain crystal (with some of the largest crystals in the world), mica, asbestos, and precious stones. Mountain crystal is mined in several places. Several hundred western Pamir inhabitants work in that industry during the summer season.

The local handicraft industry plays a definite part in the people's economic activities. Firewood, lime, brick, cloth, clothing, headgear and a number of other household items are produced by the industrial combines of the rayon. Homemade articles are still in production. Wooden shoes with 3 cleats for walking in the mountains, and soup spoons with perpendicular handles are produced in the Vanch Valley, and ornate woolen stockings which became popular also in other places of western Pamir, are made in the Yazgulem Valley. The smelting of metal in primitive furnaces and the production of metal objects for local needs have been practiced in the Vanch Valley since ancient times.

Khorog, the capital of the autonomous oblast, is situated on the high terraces of a deep valley along the Gunt River bank, not far from its confluence with the Pyandzh River. The city extends for more than a kilometer along the river bank. Its main street is a long avenue lined with tapered poplars. It has a park of culture and rest, a lake, and a stadium. The orchards consist of apricot, peach, walnut, mulberry, cherry, and other trees and shrubbery. In addition, there are vegetable gardens, melon plantations, and barley, wheat, and lucerne fields, all of which make the city very attractive. Khorog has its own hydroelectric power plant on the Gunt River, which produces electric power also for

the neighboring collective farms. A city water-supply system is under construction. The city also has a polyclinic, a hospital, an oblast musical and dramatic theatre, a pedagogical school, a medical and agricultural school, and it publishes 2 oblast newspapers.

Undergoing improvement are the rayon centers of Vanch, Rushan, Roshtkala, and Ishkashim, as well as a number of kishlaks.

The improvement of western Pamir's economy involves the full utilization of its diverse but favorable natural conditions: the expansion of the oldest branches of agriculture, grain production and animal breeding, and the further development of new branches such as silkworm cultivation, and fruit and vegetable growing. The latter 2 branches could produce enough raw materials for a small canning enterprise in Khorog.

Eastern Pamir

Eastern Pamir is the largest region of Tadzhikistan, covering an area of 38,000 sq km or almost 27% of the republic's territory. From an administrative point of view, eastern Pamir is the Murgabskiy Rayon of the Mountain-Badakhshan Autonomous oblast.

Eastern Pamir is very high above sea level, and even the lowest parts of its valleys do not extend below 3,600 m. The upland is not very much dissected despite the high altitude. Its surface is a system of broad flat valleys and depressions alternating with comparatively low mountain chains. The Pamir upland is surrounded on all sides by very high mountain chains which prevent the inflow of humid air and reduce precipitation (60-70mm). The high absolute altitude, the Arctic-like climate (the annual frostfree season lasts 6 weeks) and insignificant precipitation combined to produce the peculiar vegetative landscape of eastern Pamir, the high-altitude desert. There are no trees up there, only occasional shrubbery may be found growing along river banks and between cliffs; the herbage is very meager. But the eastern Pamir pastures have an advantage over the other high-altitude pasturelands: they can be used also in winter time as there very little snow falls in most of the region.

Eastern Pamir is inhabited by Kirgizians, who raise sheep, goats, and yaks. United into collective farms, they spend the winter in permanent dwellings and move with their cattle along the mountain valleys in summertime. Here is a typical itinerary of one of the eastern Pamir collective farms. The Molotov Kolkhoz is located near Murgab. The kolkhoz's summer pasture is in the wide valley of the Vostochniy Pshart River, at the foothills of the Muzkol Mountain Range. A number of short canyons open into the valley. Their stream beds only contain water in the second half of the day when the snow feeding those streams begins to

melt. The vegetation is very sparse. Various types of wormwood, feather grass, and other desert plants grow on pebble soil, and the herbage is so meager as to make the valley surface appear completely bare in some places. The canyon slopes, watered by the daily melting snow, look more verdant. Green alpine grass plots can be seen here and there near the streams running along the bottom of the canyons. The collective farmers come with their cattle to the Pshart Valley by the middle of May and break up into groups containing 5-10 herds each. Each group then occupies one or 2 canyons, depending on the number of cattle. The Kirkizians live in felt yourtas (nomad tents). In summer camp they lay in reserves of dry cheese, butter, and cream. In that camp, too, they shear their sheep, goats, and yaks. The cattle grows fat in August and September. By the middle of October, i.e., 4 months later, the Kirgizians move back to the Aksu River Valley near Murgab to spend the winter, having traveled a distance of only 25-30 km. The Aksu River Valley is covered with hilly meadows, with a low but thick and snowfree vegetation. The cattle are kept on those pastures through the winter. On very cold days the sheep are fed additional hay which has been prepared beforehand in the valley. The collective farmers here live in warm clay huts.

Most of the eastern Pamir cattle consist of sheep and goats. The Kirgizian breed of broadtail sheep are not inferior to the Gissar sheep. There are no small Darvaz sheep in these flocks. There are very few horses, donkeys, and camels in this region, since they cannot reproduce at such altitudes. But there is an abundance of yaks here. This is one of the largest domestic animals, some of which attain a weight of 800 kg. The yak has powerful lungs, strong muscles, a thick hide, and thick wool and is quite adapted to life on high-altitude plateaus. The yak supplies meat, milk, wool, and hides for the population, and is indispensable as a draft animal. A yak-breeding state farm, the only one of its kind in the Soviet Union, was opened in 1945 on the shore of the mountain lake of Bulunkul' for the purpose of developing and improving the breed of this valuable animal.

The natural pastures of Eastern Pamir are now being irrigated, but as yet only on a small scale.

The biological station of the Academy of Sciences Tadzhik SSR, located in the Chechkta sector not far from Murgab at an altitude of 3,860 m above sea level, is now making a study of the eastern Pamir fodder base and developing new measures designed to improve the pastureland.

Machines came to the aid of the animal breeders. MTS was built in Pamir in 1951.

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In recent years, a considerable part of eastern Pamir cattle has been driven to the pasture-rich Alay Valley, which lies at an altitude of 3,000 m above sea level. The cattle is kept on that grazing land all year round. The horse-breeding farm, opened in the Alay Valley in 1949, is working on the development of a Lokay breed of horses. A village of animal-breeding kolkhozes of eastern and western Pamir grew up near the bank of the Saryngol River. Using the machinery of the Murgab MTS, the collective farms lay in reserves of hay and natural grasses and plant fodder cultures on the irrigated land.

Rare metals, coal, peat, and salt (near Lake Rangkul') were discovered in eastern Pamir, and some of them as being processed. These deposits are among the highest in the world. There is some fishing in a few of the lakes (Bulunkul', Yashil'kul', etc), but not much. An auxiliary occupation of the collective farmers is hunting.

Murgab, on the East Pamir Highway, serves as an administrative and cultural center of eastern Pamir. This highway connects Khorog and Osh (Fergana Valley) and carries a fair amount of traffic in the summer. Along this highway gasoline, machines, equipment, fertilizer, seeds, lumber, industrial commodities, and foodstuffs are transported to western and eastern Pamir.

There are great possibilities for further expanding the animal-breeding and mining industries in eastern Pamir.

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FIGURE CAPTIONS

/Figure top page 8 of original/ The Gissar Mountain Range. View from the South. /Photo/

/Figure bottom page 8 of original/ The Vakhsh River. /Photo/

/Figure page 9 of original/ Cotton fields in the Vakhsh Valley. /Photo/

/Figure page 10 of original/ Hypsometric map of Tadzhikistan: Profile of relief in m; glaciers and permanent snow banks.

/Figure page 11 of original/ Orographic diagram of Tadzhikistan: Mountain ranges higher than 3,000 m (____); Mountain ranges lower than 3,000 m (____).

/Figure top page 20 of original/ Average temperature for January.

/Figure bottom page 20 of original/ Average temperature for July.

/Figure page 21 of original/ Annual precipitation. /The scale ranges from 100 mm or less to 800-1,000 mm or more/

/Figure page 29 of original/ The river network.

/Figure top page 33 of original/ Lake Kara-Kul'. Permanent ice on the eastern shore. /Photo/

/Figure bottom page 33 of original/ Lake Sarez. /Photo/

/Figure page 36 of original/ The Soil of Tadzhikistan (according to A. N. Rozanov):

light sierozem soil of the desert belt

ordinary sierozem soil of the desert-steppe belt

dark sierozem soil of the desert-steppe belt

dark-gray soil of the mountains and brown, dry steppe soil

brown forest-steppe soil from the mountains

meadow and meadow-steppe soil of the subalpine belt

meadow and meadow-steppe soil of the alpine belt

high-altitude brown steppe soil

high-altitude desert soil of eastern Pamir and the peat-meadow soil of its valleys

nonsoil formations

/Figure page 41 of original/ The Vegetation of Tadzhikistan (according to P. N. Ovchinnikov, K. V. Stankovich, et al.):

wormwood and wormwood halophytic deserts, desertlike semisavannahs and lowland bogs

semisavannahs covered with high vegetation and "shiblyak" fragments.

forests, scattered trees, and shrubbery (pistachio trees in southern Tadzhikistan

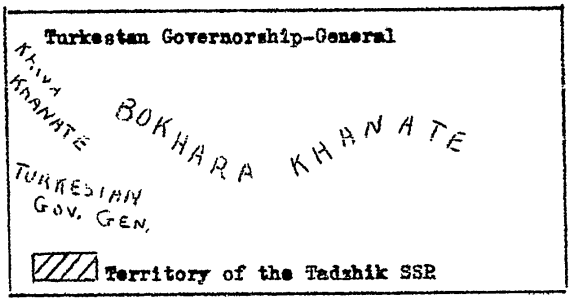
ordinary, cryophilous and desert steppes and wormwood-covered steppelike deserts.

subalpine diverse-herbage meadows, cryophilous wasteland and thistles (the latter do not grow in eastern Pamir)

high-altitude wormwood-covered deserts

cliffs, tali, glaciers, and sparse vegetation of the high plateaus

[Figure page 70 of original] The formation of the territory of the Tadzhik SSR:



[Figure top page 75 of original] The Anzob kishlak in the Yagnob River Valley. [Photo]

[Figure bottom page 75 of original] The Matcha kishlak in the Zeravshan Valley. [Photo]

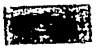
[Figure page 77 of original] A corner of the bazaar in Kanibadam. The sale of rugs. [Photo]

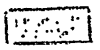
[Figure page 81 of original] A house of culture in a collective farm. [Photo]

[Figure page 87 of original] Tree planting on the southern slope of the Gissar Mountain Range. [Photo]

[Figure page 89 of original] A Dam on the Vakhsh Canal [Photo]

/Figure page 91 of original/ Major Branches of Agriculture in the Tadzhik SSR


cotton growing


production of grain and oil-bearing cultures


sheep-breeding for meat and wool and astrakhan fur production purposes


sheep-breeding for meat and wool production purposes

Well developed districts:


horticulture and silk-worm cultivation


oil-bearing cultures


viticulture


jute


tobacco and rice


principal land massifs not used for agricultural purposes

/Figure page 93 of original/ The cultivable land of the Tadzhik SSR:


irrigated land including the cotton area


irrigated land not including the cotton area


cultivated unirrigated land

/Figure page 95 of original/ Hauling cotton to the cotton processing plant. /Photo/

/Figure top page 96 of original/ Mechanized stacking of cotton. /Photo/

/Figure bottom page 96 of original/ A cotton-processing plant in Kurgan-Tube. /Photo/

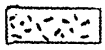
/Figure top page 97 of original/ A kolkhoz hydroelectric plant in the Gissar Valley. /Photo/

/Figure bottom page 97 of original/ A children's creche in one of the Gissar Valley collective farms. /Photo/

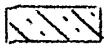
/Figure page 100 of original/ Grape picking on the Shakhrinau State Farm. /Photo/

/Figure page 101 of original/ Gissar sheep on autumn pastures. /Photo/

/Figure page 103 of original/ The pastures of the Tadzhik SSR:



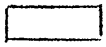
autumn-winter-spring pastures of the plains, foothills, and western Pamir



mountain and high-altitude summer pastures

year-round pastures of Eastern Pamir, Alay Valley, and Kyzyl-Kum

pastures outside the republic



unsuitable land

/Figure top page 104 of original/ Cattle routes to the summer pastures.

/Figure bottom page 104 of original/ Cattle routes to the winter and year-round pastures.

/Figure page 106 of original/ Cattle being driven to mountain pastures. /Photo/

/Figure page 109 of original/ Drying cocoons in the shade. /Photo/

[Figure page 125 of original] The distribution of industry in the Tadzhik SSR:

Minerals

- coal
- hard coal and lignite
- table salt
- fluorspar
- mountain crystal
- other rare metals
- polymetals
- A asbestos
- S antimony
- M arsenic
- Bm bismuth

Industrial centers

- Most important: STALINABAD
- Considerable: Regar
- Others: Kulyab

Power Plants

Hydro-electric power plants
- existing
- under construction
- thermal, under construction

Industries

- cotton processing
- textile
- other light industry
- food
- mining
- metal processing
- building materials

- broad-gauge railroads
- narrow-gauge railroads
- principal auto highways
- other auto highways

The industrial structure is shown by branches without any quantitative index.

[Figure top page 130 of original] An old-fashioned bridge in the Tadzhik mountains. [Photo]

[Figure bottom page 130 of original] A bridge across the Kafirnigan River in the Gissar Valley. [Photo]

[Figure top page 135 of original] Administrative-territorial division of the Tadzhik SSR:

- I rayons under republican jurisdiction
- II Leninabad oblast
- III Mountain-Badakhshan Autonomous oblast
- state boundaries
- boundaries of union republics
- oblast boundaries
- rayon boundaries

[Figure bottom page 135 of original] Economic regions of the Tadzhik SSR:

West Fergana Valley

Zeravshan Valley

Central Tadzhikistan

Gissar Valley

Southeast Tadzhik

Eastern Pamir

Southwest Tadzhik

Western Pamir

[Figure page 137 of original] Western part of the Fergana Valley:

— — —	SSR boundaries
Leninabad	cities
Kansai	city-type settlements
Yantak	other inhabited points
	railroads
	principal highways
	irrigation canals
	valley bottom and lowland plains
	foothill plains
	medium and high mountains

[Figure page 144 of original] The newly-irrigated lands and those to be irrigated in the western part of the Fergana Valley.

gravity irrigation — canals

machine irrigation — dams

[Figure page 155 of original] A street in old Khodzhent. [Photo]

[Figure page 156 of original] A settlement of the Leninabad Silk Combine [Photo]

[Figure page 158 of original] A weaving mill of the Leninabad Silk Combine. [Photo]

[Figure page 164 of original] Zeravshan Valley land scheduled for irrigation:

gravity irrigation

machine irrigation

[Figure page 166 of original] The Gissar Valley:

Regar — cities

Gissar — city-type settlements

Varzob — other inhabited points

railroads

highways

irrigation canals

the valley bottom

foothill plains and low mountains

medium and high mountains

[Figure page 170 of original] Gissar Valley land scheduled for irrigation:

- gravity irrigation
- machine irrigation
- existing canals

[Figure page 175 of original] One of the hydroelectric stations of the Varzob cascades. [Photo]

[Figure page 176 of original] Structure of the Stalinabad industry as measured in commodity value (in %):

Branches:

1. light industry:
   - cotton processing 15%
   - cotton fabrics 12.4%
   - sewing industry 14.3%
   - other light industries 13.6%
2. food industry:
   - bread baking 10.8%
   - other food industries 13.9%
3. metal processing industry: 7.4%
4. building materials industry: 7.3%
5. other branches of industry: 5.3%

[Figure page 176 of original] General view of Stalinabad. In the foreground the House of Government and Lenin street. [Photo]

[Figure top left page 177 of original] The State Public Library imeni Firdousi. [Photo]

[Figure bottom left page 177 of original] Performance by amateur art group in Stalinabad. [Photo]

[Figure top right page 177 of original] Stalinabad:

- city limits
- part of the city covered with buildings
- orchards, nurseries, and parks
- broad-gauge railroad tracks
- narrow gauge railroad tracks
- auto highways

[Figure page 178 of original] The Large Gissar Canal. [Photo]

[Figure page 180 of original] Ulitsa Lenina in Stalinabad. [Photo]

[Figure page 184 of original] The Vakhsh Valley

- valley bottom
- foothill plains
- low and medium mountains
- state boundaries
- Kurgan-Tube — cities
- Vakhshstroy — city-type settlements
- Uyals — other inhabited places
- railroads
- highways
- irrigation canals

[Figure page 187 of original] Southwest Tadzhik lands scheduled for irrigation:

- gravity irrigation
- machine irrigation
- dams
- tunnels
- existing canals

[Figure page 190 of original] Lemons grown in trenches in the Vakhsh Valley. [Photo]

[Figure page 194 of original] Southeastern Tadzhikistan

low broad valleys

foothill plains

medium and high mountains

boundaries of economic regions

state boundaries

Kulyab — cities

Parkhar — city-type settlements

Kangurt — other inhabited places

highways

[Figure page 199 of original] Southeast Tadzhik lands scheduled for irrigation

gravity irrigation

machine irrigation

dams

[Figure page 206 of original] A commercial dairy farm on the Garm Sovkhoz. [Photo]

[Figure top page 208 of original] In the Surkhob river valley. Novabad is in background. [Photo]

[Figure bottom page 208 of original] Tadzhiks from the Yagnob Valley. [Photo]

[Figure top page 209 of original] A Kirgiz woman from the Dzhirgatal'skiy Rayon. [Photo]

[Figure bottom page 209 of original] A typical eastern Pamir landscape. On the Osh-Khoreg Highway. [Photo]

[Figure page 212 of original] A Pamir Tadzhik woman. [Photo]

[Figure page 213 of original] The Chu-Khoreg Kishlak. [Photo]

[Figure page 215 of original] A street in Khorog. [Photo]

[Figure page 217 of original] Pioneers from Khorog. [Photo]

[Figure page 218 of original] A Kirgiz Yourta in Eastern Pamir. [Photo]

[Figure page 219 of original] A summer grazing camp in Eastern Pamir. [Photo]

[Figure page 220 of original] A farm in the Alichur Valley of Eastern Pamir. [Photo]

[Figure page 221 of original] Yaks in Eastern Pamir. [Photo]

[Figure page 222 of original] A biological station of the Academy of Sciences Tadzhik SSR in Eastern Pamir. [Photo]

[Figure page 223 of original] Murgab. [Photo]

[Figure page 224 of original] The Tadzhik SSR:

— · — · —	state boundaries
— — — —	union republic boundaries
— ·· — ·· —	oblast and autonomous oblast boundaries
◎	cities
⊙	city-type settlements
○	rural inhabited places
Stalinabad	capital of union republic
Leninabad	oblast and autonomous oblast centers
Kulyab	rayon centers
Koktash	other inhabited places

(continued on next page)

	broad-gauge railroads
	narrow-gauge railroads
	principal auto highways
	other automobile highways
	major irrigation canals
	wharves
X	mountain passes
.7495	altitude in meters
	permanent snow banks and glaciers

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